WALLULA-SMITHS HARBOR SEGMENT OF THE WALLULA-MCNARY TRANSMISSION LINE PROJECT BIOLOGICAL ASSESSMENT

Prepared for:

BONNEVILLE POWER ADMINISTRATION
Portland, Oregon

Prepared by:

ENTRIX, INC.
Olympia, WA

Project No. 326801

July 26, 2002

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Wallula Generation, LLC is proposing to build and operate a 1,300-megawatt (MW) natural gas-fired combustion turbine power plant and associated facilities in Walla Walla County, Washington. The Wallula Power Project would be designed to provide low cost electric energy to meet the growing needs of the Pacific Northwest and other interconnected electric transmission areas where electrical energy is needed.

The overall project, which is shown in Figure 1.1, can be divided into four general components, summarized in the following bullets. **This biological assessment (BA) is provided for the 5.1-mile Wallula-Smiths Harbor transmission line segment and the Smiths Harbor Switchyard (First two bullets listed below).**

- **A 5.1-mile 500-kilovolt (kV) transmission line (Wallula-Smiths Harbor transmission line segment) to interconnect the proposed Wallula Power Plant to the existing electrical grid system.**

- **A new electric switchyard (Smiths Harbor Switchyard) where the interconnection of the new power to the existing power grid would take place.**

- The power generation plant and it's associated facilities (Wallula Substation).

- A 28-mile 500-kV transmission line connecting the new switchyard and the existing McNary Substation (Smiths Harbor-McNary segment).

The proposed power plant, facilities and associated utility line will be located approximately 8 miles south of the city of Pasco, in southeastern Washington. These utility lines include a 4.6-mile makeup water supply pipeline from the existing Boise Cascade Corporation fiber farm water wells, a 5.9-mile natural gas pipeline interconnection, and permanent county access roads. A biological assessment has been previously completed for this portion of the Wallula Power Project (Appendix D).

To distribute the electricity generated by the Wallula Power Project to the locations requested by the proponent, the Bonneville Power Administration (BPA) has determined that 5.1-miles of new 500-kV transmission line and the construction of a new switchyard at Smiths Harbor switchyard would be required. **The 5.1-mile segment (Wallula-Smiths Harbor segment) and the Smiths Harbor Substation are the primary focus of this biological assessment (BA).**

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The 28-mile segment of transmission line would not be needed at this time for the Wallula Power Project, but may be needed in the near future if other proposed projects are approved.

The Wallula-Smiths Harbor transmission line and the Smiths Harbor Switchyard are both interrelated and interdependent on the completion of the Wallula Power Plant. If the proposed Wallula Power Plant does not go forward and is not built, there will be no need for the transmission line or the switchyard. Conversely, without the completion of the transmission line and switchyard, the power plant will have no ability to transfer its electrical generation and would therefor be not viable.

2.1 PROJECT LOCATION AND ACTION AREAS

The Wallula-Smiths Harbor 500-kV transmission line for the Wallula Power Project originates at the generation plant, which is located in the northwestern portion of Walla Walla County, Washington. The generation plant is approximately 8 miles south of the City of Pasco, 2 miles north of the unincorporated community of Wallula, and 7 miles southeast of the unincorporated community of Burbank. The project site is within the southern half of Section 34, Township 8 North, Range 8 East, and is bordered on the west by Highway 12 with the Union Pacific Railroad bordering the project site to the east. Lake Wallula (the McNary Pool reach of the Columbia River) is located approximately 800 feet to the west. The transmission line is approximately 5.1 miles in length and terminates at the proposed Smiths Harbor switchyard that is located in the northwest corner of the northeast quarter of Section 24, Township 7 North, Range 31 East. Figure 2.1 shows a detail of the Wallula-Smiths Harbor segment along its newly proposed route.

All areas within a two-mile radius of the project are to be considered "action areas" under the Endangered Species Act (ESA), as defined by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). The action areas for the Wallula-Smiths Harbor transmission line segment and the Smiths Harbor Switchyard incorporate areas of industrial development, agricultural croplands, undeveloped grass and shrub-steppe habitat, as well as portions of the Columbia River. This action area also incorporates part of a 1,243-acre cottonwood farm to be purchased from Boise Cascade Corporation, by Wallula Generation, LLC.

2.2 PROJECT DESCRIPTION

The Wallula-Smiths Harbor segment is required to connect the Wallula Power Project to the existing Federal Columbia River Transmission System grid. Currently there are no existing high voltage transmission lines along this portion of the route. Much of this segment of transmission line would be on land, with the rights either owned or optioned by Wallula Generation, LLC.

2.2.1 RIGHT OF WAY AND ACCESS ROADS

BPA would acquire any additional easements for right-of-way needed for the transmission lines or access roads from the landowners. The easements would give BPA the rights to construct, operate and maintain the line and access roads in perpetuity. A right-of-way 150 feet in width would be purchased for the 5.1-mile Wallula-Smiths Harbor segment of the transmission line.

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General right-of-way access in the Wallula-Smiths Harbor segment is primarily along county and agricultural roads. Access for the transmission line would be from new roads constructed within the right-of-way purchased by BPA. New roads would be 16 feet wide and located within the right-of-way paralleling the transmission line. The road would be constructed from near the NE corner of section 23 T7N R31E to the approximate middle of the east border of section 2 T7N R31E (approximately three miles). From the approximate middle of the east border of section 2 T7N R31E, the road will continue in as straight a route as practical to the Wallula Power Generation Plant.

Access to the new Smiths Harbor Switchyard will require major reconstruction and rocking of one road approximately three miles long. The section line road to the east of the existing Boise Cascade tree farm (along the boundary between sections 1 and 2, 11 and 12, 13 and 14, T7N R31E) would be widened to a 20-foot wide single-lane road with a gravel top course for access to the switchyard. The zone of disturbance for road construction would be approximately 25 feet wide.

Currently, road access to the transmission line right-of-way exists along much of this segment and minimal improvements would be required. Access to the Wallula-Smiths Harbor segment is provided by Attalia Road, a graded gravel road that runs from Highway 12 to approximately the middle of the north-south run of this segment. Furthermore, access on the northern portion of the segment is provided by three graded dirt roads which converge together and then connect to Highway 12.

2.2.2 Transmission Line and Towers

The approximately 5.1-mile Wallula-Smiths Harbor segment would be constructed along a new right-of-way that does not parallel any existing BPA transmission lines. Construction of this transmission line would take advantage of existing county and other public roads for access, to the maximum extent practicable, as well as private agricultural access roads with appropriate landowner easement. The route of this transmission line primarily traverses shrub-steppe environments.

The 500-kV transmission line would be supported by approximately 25 steel lattice structures averaging 145 feet in height. Most of these structures would be the "delta" design, which are designed to elevate the wires a safe distance above the ground on relatively straight stretches between towers. The standard span distance between these structures would be approximately 1,150 feet. At locations where the run of the transmission line undergoes sharp angled turns and at each end of the run "dead end" structures will be needed. These dead end structures elevate the conductors above the ground and equalize tension of the conductors between two segments of transmission line when the line makes a turn. Approximately six dead end structures would be needed.

2.2.3 SMITHS HARBOR SWITCHYARD

The Smiths Harbor Switchyard would be a new facility in the transmission system. The switchyard would be constructed within shrub-steppe habitat. A switchyard serves the same functions as a substation except that it does not regulate voltage fluctuations. The following equipment would be required at the Smiths Harbor Switchyard:

- Switchyard fence – A chain-link fence with barbed wire on top provides security and safety. Space to maneuver construction and maintenance vehicles is provided between the fence and the electrical equipment.

- Switchyard rock surfacing – A 3-inch layer of rock selected for its insulating properties is placed on the ground within the switchyard to protect operation and maintenance personnel from electrical danger during switchyard electrical failures.

- Bus tubing, bus pedestals – Power moves within a switchyard and between breakers and other equipment on rigid aluminum pipes called bus tubing. Bus tubing is elevated by supports called bus pedestals.

2.2.4 OPERATION AND MAINTENANCE ACTIVITIES

BPA would perform routine and periodic maintenance and emergency repairs on structures, switchyards, conductors and other equipment. These activities could include replacing insulators or repairing damaged conductors and other ancillary equipment. Within switchyards, BPA may need to replace equipment periodically. BPA would utilize the access roads described in the previous sections to perform repairs and routine maintenance.

BPA would also maintain the access roads and the right-of ways. Maintenance on roads would include road grading, clearing of vegetation, and repairing ditches and culverts as necessary. Very little clearing of vegetation is anticipated for maintenance of the right-of-way. However, any vegetation would be trimmed if necessary to maintain regulatory height restrictions near the transmission lines.

2.2.5 BOISE CASCADE COTTONWOOD FARM

The Wallula Power Project would include the purchase of the Boise Cascade Corporation cottonwood plantation land to the south/southeast of the proposed generation site. Water currently used to irrigate 1,243-acres of the cottonwood plantation would be diverted for use at the power plant. As a result, the use of this land for irrigated agriculture would cease. The land where the cottonwood plantation is currently located would be managed as a conservation area and converted to cultivated dryland grasses or dryland grasses and shrubs.

3.1 SPECIES INFORMATION

Information on federally threatened, endangered, and candidate species has been obtained from the U.S. Fish and Wildlife Service (USFWS 2000 and 2001), Washington Department of Fish and Wildlife (2000 and 2001), and the National Marine Fisheries Service (NMFS 2000). Furthermore, the USFWS responded to a request for an updated listing of species on August 29, 2001 (Appendix A). Table 1 summarizes the state and federal species of concern potentially located in the action area for this BA.

Additional information has been requested from USFWS and will be included in an addendum if necessary. The action area for the current project is within the area covered by the endangered and threatened species listings previously attained. Habitat types and availability are consistent with the previous action area, with the exception of a large cottonwood farm in the current site. Given the proximity and similarities between the sites, no issues are foreseen arising from this assumption. New information regarding ESA-listed of proposed species occurrences in or near the action areas is anticipated.

3.1.1 SNAKE RIVER SOCKEYE SALMON HABITAT USE AND CRITICAL HABITAT AVAILABILITY IN ACTION AREA

Snake River sockeye salmon (*Oncorhynchus nerka*) were formally listed as an endangered species under the ESA on November 20, 1991 (56 FR 58619). During their migration to and from their spawning habitat, this evolutionarily significant unit (ESU) of Snake River sockeye will migrate thorough the action area of this project. Even though the boundary limit for this ESU of sockeye salmon lies entirely within the state of Idaho, the mainstem Columbia River from the mouth to the confluence of the Snake River has been designated critical habitat for Snake River sockeye salmon (58 FR 68543).

The Snake River sockeye salmon are considered to be "lake-type" sockeye salmon. This means the adults will spawn in lakes or near lakes. After emergence, the juveniles will migrate to lakes and spend one to three years there before their migration to marine waters. After a one to four year period in the ocean, sockeye salmon will migrate back to their spawning sites (Gustafson et al. 1997). Sockeye salmon have similar environmental requirements as other Pacific salmonids, e.g. substantial cover, high water quality and water temperatures general less then 15^{o} C.

During the migration from Redfish Lake in Idaho to the ocean, the juvenile Snake River sockeye salmon will migrate past the action area between the months of April to May. Returning adults migrate back to Redfish Lake from July through September (Waples and

Table 1. Summary Listing of Species of Concern for the Project Vicinity and Associated Areas.

Common Name	Scientific Name	Federal Status	State Status	Sited During Surveys
Plants				
Beaked cryptantha	*Cryptantha rostellata*		S	x
Bristly sedge	*Carex comosa*		S	
Gray cryptantha	*Cryptantha leucophaea*	SOC	S	
Plumed clover	*Trifolium plumosum var. plumosum*		S	
Prairie lupine	*Lupinus cusickii*	SOC	R	x
Pulsifer's monkey flower	*Mimulus pulsiferae*		S	
Sabin's lupine	*Lupinus sabinii*		E	
Snake Canyon desert parsley	*Lomatium serpentinum*		S	
Ute ladies' tresses	*Spiranthes diluvialis*	T		
Washington mokey-flower	*Mimulus washingtonesis*		R	
Priority Habitats				
Shrub-Steppe			P	
Birds				
Aleutian Canada goose	*Branta canadensis leucopareia*		T	
American white pelican	*Pelecanus erythrorhynchos*		E	x
Bald eagle	*Haliaeetus leucocephalus*	T	T	x
Black-crowned night heron	*Nycticorax nycticorax*		M	
Caspian tern	*Sterna caspia*		M	x
Common loon	*Gavia immer*		S	
Ferruginous hawk	*Buteo regalis*	SOC	T	x
Forster's tern	*Sterna forsteri*		M	
Golden eagle	*Aquila chrysaetos*		C	x
Lewis' woodpecker	*Melanerpes lewis*		C	
Loggerhead shrike	*Lanius ludovicianus*	SOC	C	x
Long-billed curlew	*Numenius americanus*		M	x
Merlin	*Falco columbarius*		C	
Northern goshawk	*Accipiter gentilis*	SOC	C	
Olive-sided flycatcher	*Contopus borealis*	SOC		
Oregon vesper sparrow	*Pooecetes gramineus affinis*	SOC	C	
Peregrine falcon	*Falco peregrinus*	SOC	E	
Sage grouse	*Centrocercus urophasianus*	SOC	T	
Sage sparrow	*Amphispiza belli*		C	
Sage thrasher	*Oreoscoptes montanus*		C	
Sandhill crane	*Grus canadensis*		E	
Snowy plover	*Charadrius alexandrinus*	T	E	
Streaked horned lark	*Eremophila alpestris strigata*	SOC	C	
Swainson's hawk	*Buteo swainsonii*		M	x
Vaux's swift	*Chaetura vauxi*		C	
Western burrowing owl	*Athene cunicularia hypugea*	SOC	C	x
Willow flycatcher	*Empidonax traillii*	SOC		

Table 1. Continued. Summary Listing of Species of Concern for the Project Vicinity and Associated Areas.

Common Name	Scientific Name	Federal Status	State Status	Sited During Surveys
Mammals				
Black-tailed jackrabbit	*Lepus californicus*		C	x
Fringed myotis	*Myotis thysanodes*	SOC		
Ord's kangaroo rat	*Dipodomys ordii*		M	x
Pale Townsend's big-eared bat	*Plecotus townsendii pallescens (=Coryhorhinus townsendii)*	SOC	C	
Small-footed myotis	*Myotis ciliolabrum*	SOC		
Washington ground squirrel	*Spermophilus washingtonii*	C	C	
White-tailed jackrabbit	*Lepus townsendii*		C	x
Yuma myotis	*Myotis yumanensis*	SOC		
Reptiles				
Northern sagebrush lizard	*Sceloporus graciosus graciosus*	SOC		
Amphibians				
Columbia spotted frog	*Rana luteiventris*	SOC	C	
Oregon spotted frog	*Rana pretiosa*	SOC	E	
Western toad	*Bufo boreas*	SOC	C	
Fish				
Bull trout – Columbia River Distinct Population Segment (DPS)	*Salvelinus confluentus*	T	C	
Chinook Salmon – Middle Columbia River Spring/Summer and Fall Run ESUs	*Oncorhynchus tshawytscha*	T	C	
Chinook Salmon – Upper Columbia River Spring Run ESU	*Oncorhynchus tshawytscha*	E	C	
Steelhead – Middle Columbia River ESU	*Oncorhynchus mykiss*	T	C	
Steelhead – Snake River ESU	*Oncorhynchus mykiss*	T	C	
Steelhead – Upper Columbia River ESU	*Oncorhynchus mykiss*	E	C	
Margined Sculpin	*Cottus marginatus*	SOC	S	
Leopard Dace	*Rhinoichthys falcatus*	SOC	C	
White Sturgeon	*Acipenser transmontanus*	SOC	C	
River Lamprey	*Lampetra ayresi*	SOC	C	
Pacific Lamprey	*Entosphenus tridentatus*	SOC		
Sockeye Salmon – Snake River ESU		E	C	
Westslope Cutthroat Trout	*Oncorhynchus clarki lewisi*	SOC		
Interior Redband Trout	*Oncorhynchus mykiss gairdneri*	SOC	C	

Federal and State Status Codes
C = Candidate
E = Endangere
S = Sensitive
SOC = Species of Concern
T = Threatened

Johnson 1991). No substantive rearing of Snake River sockeye salmon occurs on the Columbia River in the vicinity of this action area. Furthermore, the Snake River sockeye salmon are only in the action area for short periods during their migrations.

3.1.2 Chinook Salmon Habitat use and Critical Habitat Availability in Action Area

Three different federally listed ESU's of chinook salmon (*Oncorhynchus tshawytscha*) are known to pass through the Wallula Power project action area. Both the spring/summer and the fall populations of Snake River chinook salmon have been federally listed as threatened species under the ESA on April 22. 1992 (54 FR 23458). Furthermore, NMFS listed the Upper Columbia River spring chinook salmon as endangered on March 24, 1999 (64 FR 14308). The boundary limits for these ESU's of chinook salmon lie entirely outside of Lake Wallula. However, due to the potential presence of migrating salmon throughout the year, the mainstem Columbia River has been designated critical habitat for chinook salmon (58 FR 68543 – revised in 64 FR 57399, 65 FR 7764).

Both the Columbia River and Snake River chinook salmon are considered to be ocean-type chinook salmon, meaning that they outmigrate as sub-yearlings during the summer and fall after emergence, spending little time in their natal streams and rivers (Mathews and Waples 1991; Waples et al. 1991; Myers et al. 1998). After 4 to 5 years in the ocean, these chinook salmon began the migrations back to their spawning grounds. Chinook salmon also require substantial cover, high water quality and cool water temperatures.

Listed chinook salmon can be present in the action area on a limited basis during the migrations to and from spawning sites. Returning adult Snake River chinook salmon migrate though the Columbia River from May to October (includes both spring/summer and fall Chinook salmon populations). Returning Upper Columbia River chinook salmon adults migrate from March through May (Mathews and Waples 1991, Waples et al. 1991).

3.1.3 Steelhead Trout Habitat use and Critical Habitat Availability in Action Area

Three stocks of steelhead trout (*Oncorhynchus mykiss*) that utilize areas within the action area as critical habitat have been listed as threatened or endangered. These include Upper Columbia River steelhead trout, which are listed as endangered (62 FR 43937); Middle Columbia River steelhead trout, listed as threatened (62 FR 14517); and Snake River steelhead trout, also listed as threatened (62 FR 43937). The boundary limits for the ESU's of Upper Columbia River and Snake River steelhead trout lie entirely outside of Lake Wallula. Due to the potential presence of migrating steelhead throughout the year, the mainstem Columbia River has been designated critical habitat for these ESU's. In contrast, Lake Wallula is within the boundaries of the Middle Columbia River steelhead trout and these fish may be found in residence of this action area.

Steelhead trout generally remain in fresh water habitats for one to three years before migrating to salt water. The returning adults may spend between 1 to 2 years in salt water before returning upriver. In contrast to most other salmonids, steelhead trout may reside in the fresh water up to a year before spawning (Busby et al. 1996).

After several years in fresh water, most juveniles within these ESU's will migrate to marine environments from April through June. Adult steelhead trout from these ESU's migrate back to their natal streams from March through May and June through October.

Steelhead trout have similar environmental requirements as other Pacific salmonids, including substantial cover, high water quality and cool water temperatures. Steelhead trout have been shown to be especially sensitive to water temperatures, water temperatures exceeding 17^{o}C have been found to impact juvenile steelhead trout populations (Frissell et al. 1992).

3.1.4 Bull Trout Habitat use and Critical Habitat Availability in Action Area

The population of Columbia River bull trout (*Salvelinus confluentus*) was federally listed as threatened by the USFWS on June 10, 1998 (63 FR 31647). This listing includes all waters of the watershed from the mouth of the Columbia River to the Canadian border. The fragmented nature of the population within this watershed is the primary basis for the broad listing of these trout (WDFW 1998).

Newly hatched bull trout emerge from their gravel beds in the spring. After emergence, bull trout are known to exhibit four distinct life history patterns based on differences in migration preference. Resident bull trout spend their entire lives within the same stretch of headwater streams. These fish are slow to mature (seven to eight years) and rarely reach sizes greater than 14 inches in length. The remaining life history alternatives include: fluvial fish that migrate within the river system; adfluvial fish that migrate between river and lake habitats; and anadromous or ocean going fish. These migrating fish typically spend two years within or near their natal waters before they migrate to their feeding grounds (Goetz 1989, WDFW 1998).

Bull trout display a high degree of environmental sensitivity during all life stages and have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). The health of bull trout populations and their distributions within a river basin appear to be directly linked to the amount of cover, channel stability, substrate composition, temperature, and migratory corridors within the basin (Rieman and McIntyre 1993). Bull trout require pristine waters and clean gravel and water temperatures between 2-10^{o} C. Water temperatures greater than 15^{o} C are believed to impose a thermal barrier for bull trout (63 FR 31647, Goetz 1989).

There are no documented populations of bull trout in the Columbia River between the Snake and Walla Walla rivers (USACOE 2000). Bull trout have been documented in the cooler upper reaches of the Walla Walla River and the tributaries of the Snake River. However, the lower reaches of the Walla Walla and the Snake rivers have been

documented as exceeding water quality parameters for temperature, which would likely limit bull trout migrations in these waterways (DOE 2000). No bull trout are expected within the action area for this project. Bull trout are not found near the mouth of the Walla Walla River (USACOE 2000), and are not expected to occur in the Lake Wallula reach of the Columbia River.

3.1.5 Bald Eagle Habitat use and Critical Habitat Availability in Action Area

In Washington State, the bald eagle (*Haliaeetus leucocephalus*) has been listed as threatened under the ESA since 1978 (43 FR 6230). However, due to a ten fold increase in population size since 1963 the U.S Fish and Wildlife Service proposed to remove bald eagles from the list of threatened and endangered species in 1999 (64 FR 36453). The decision for delisting the bald eagle is yet to be determined, therefore all protections afforded the bald eagles and their critical habitat remain intact.

Bald eagles are found along the shores of fresh and saltwater environments. Breeding territories are located in predominantly coniferous uneven-aged stands with old-growth components. Nesting locations are generally in mature old-growth trees with nearby available prey. These nests may be used in successive years. The availability of suitable nesting location is often a limiting factor in the establishment of bald eagle territories (USFWS 1986). In Washington, courtship and nest-building activities occur between the months of January and February. Eggs are laid and cared for beginning in March to early June. Chicks are hatched from mid-April to early May. Eaglets usually fledge in mid-July but may remain in the nesting location for another month (Rodrick and Milner 1991).

Wintering locations for bald eagles are dependent on suitable roosting locations and available prey. Bald eagles will use communal night roosts. Suitable roosts are usually snags or trees that are older and taller than other trees in the area. As many as 50 individuals may share a single roost (Adams et al. 2000). Food sources during the winter months for bald eagles have been shown to consist primarily of waterfowl, which is 80 to 90 percent of their diet. Fish, carrion, small mammals and other birds make up the reminder of the bald eagles food sources (Fielder and Starkey 1980, Fielder 1982).

Nesting bald eagles have not been documented within the Wallula Power Project area (USACOE 2000). This area is believed to provide only wintering habitat for bald eagles. This assumption is supported by the two wildlife surveys conducted for the Wallula Power Project, one from November 2000 through March 2001 (Smayda 2001b) and the other in May 2002 (Entrix 2002).

During the 2000/2001 winter surveys (Smayda 2001b), 71 bald eagles were sited over 14 days. Of these bald eagles, 42 were juveniles and 29 were adult birds. The majority of these bald eagles were seen within the boundaries of the McNary National Wildlife Refuge perched in the Poplar trees along the Walla Walla and Columbia River. Many were also observed perching on fence posts, on the ground, or hunting in the lagoons at

the J.R. Simplot Company cattle feedlot located to the east of the proposed project area (Smayda 2001b). These winter sightings correspond to areas of highest available prey.

During the May 2002 wildlife surveys, no bald eagles or nesting sites were observed (Entrix 2002). Given the fact that bald eagle chicks hatch within this time period, nest and nesting activity would be apparent if it were present in the area. The lack of sighting supports the assumption that this proposed project area is not currently suitable nesting habitat for bald eagles.

3.1.6 Ute ladies' tresses Habitat use and Critical Habitat Availability in Action Area

Ute ladies' tresses (*Spiranthes diluvialis*) were listed as threatened under the ESA in 1992 by the U.S. Fish and Wildlife Service (57 FR 2048). This perennial orchid was discovered in Washington State in 1997 in a wetland meadow near Wannacut Lake in Okanogan County. Fewer than 20 individual plants were found in this location (Ohlson 2000).

Generally Ute ladies' tresses occur at elevations below the coniferous forest vegetation zone within steppe, shrub-steppe or pinyon-juniper woodland zones (USFWS 1998). It is typically found between elevations of 4,000 to 6,000 feet but has been found as high as 6,800 feet. The Washington population is at approximately 1,800 feet in elevation.

The Washington State population of Ute ladies' tresses is located over 200 miles north of the Wallula Power Project site. Suitable habitat does not occur within the action area for this power project and the botanical field survey revealed no occurrences of Ute ladies' tresses (Entrix 2002).

4.1 INTRODUCTION

4.1.1 POTENTIAL EFFECTS ANALYSIS

In this chapter, the construction, operation and maintenance for the proposed construction of the Wallula-Smiths Harbor transmission line and the Smiths Harbor Switchyard are examined to determine if federally listed threatened or endangered species within the action area could potentially be affected. A summary table is provided (Table 2.). Potential impacts resulting from the construction activities associated with the proposed project are evaluated in terms of listed species and associated habitat disturbance and/or loss. The magnitude of these impacts is based upon the type, amount and duration of project effects. Impacts are characterized as direct or indirect. Direct impacts result from an immediate action of the project, such as the removal of bald eagle nesting trees for a new roadway. In contrast, indirect effects are caused by or result from the proposed action, such as the avoidance of a site by bald eagle prey species due to construction noise. Short-term impacts (construction) and long-term impacts (after project is in place) are considered. Impact assessment will focus primarily on access road and facility construction. Tower location is not known at this time, so the potential effects of this project element will be addressed in an addendum to this BA.

In addition to the potential environmental impacts arising from direct or indirect impacts, future and/or cumulative impacts from interrelated and interdependent actions in this action area are also discussed. Cumulative effects analysis considers the impacts of other projects within the action area that are unrelated to the project actions specifically addressed by the BA but that may likely occur in the future. Interrelated effects are defined as those "activities that are part of the larger action and depend on the larger action for their justification," while interdependent effects are defined as actions "which have no independent utility apart from the proposed action being considered.

4.1.2 FIELD REVIEWS

Two field reviews of the project site were conducted for the Wallula Power Project. One field survey from November 2000 through March 2001 (Smayda 2001b). The other survey in May 2002 (Entrix 2002). The purpose of the wildlife and botanical surveys were to determine the status of listed species in the area and to evaluate the potential impacts of the proposed project. Findings from the November 2000 through March 2001 field survey are discussed in the McNary Transmission Line Project Environmental Impact Statement (BPA and WSEFSEC 2002). Wildlife and botanical surveys conducted in May 2002 are provided in Appendix B and Appendix C, respectively.

Table 2. Direct, Indirect, Short-term, Long-term, and Cumulative Impacts Summary for Threatened and Endangered Species Within the Action Area.

Species	Status	Direct Short-term Impacts	Indirect Short-term Impacts	Direct Long-term Impacts	Indirect Long-term Impacts	Cumulative Interrelated & Interdependent Impacts
Sockeye Salmon-Snake River ESU (*Oncorhynchus nerka*)	F-Threatened S-Candidate	Boundary limit for this ESU lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit for this ESU lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit for this ESU lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit for this ESU lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Project action is interrelated and interdependent to the proposed power plant construction. Future construction of a 28-mile segment transmission line may occur if current projects are completed. Impacts from those project where discussed in a previous BA and conclude – may affect. No other development is envisioned associated with the proposed project action, therefore, no cumulative impacts are likely. **No effect.**
Chinook Salmon-Spring/Summer and Fall ESU (*Oncorhynchus tshawytscha*)	F-Threatened S-Candidate	Boundary limit for these ESU's lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit for these ESU's lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit for these ESU's lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit for these ESU's lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Project action is interrelated and interdependent to the proposed power plant construction. Future construction of a 28-mile segment transmission line may occur if current projects are completed. Impacts from those project where discussed in a previous BA and conclude – may affect. No other development is envisioned associated with the proposed project action, therefore, no cumulative impacts are likely. **No effect.**

Table 2. Direct, Indirect, Short-term, Long-term, and Cumulative Impacts Summary for Threatened and Endangered Species Within the Action Area.

Species	Status	Direct Short-term Impacts	Indirect Short-term Impacts	Direct Long-term Impacts	Indirect Long-term Impacts	Cumulative Interrelated & Interdependent Impacts
Chinook Salmon-Upper Columbia River ESU (*Oncorhynchus tshawytscha*)	F-Endangered S-Candidate	Boundary limit for this ESU lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit for this ESU lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit for this ESU lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit for this ESU lies outside of action area. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Project action is interrelated and interdependent to the proposed power plant construction. Future construction of a 28-mile segment transmission line may occur if current projects are completed. Impacts from those project where discussed in a previous BA and conclude "not expected to affect". No other development is envisioned associated with the proposed project action, therefore, no cumulative impacts are likely. **No effect.**
Steelhead Trout-Middle Columbia River and Snake River ESU (*Oncorhynchus mykiss*)	F-Threatened S-Candidate	Boundary limit lies outside of action area for Snake River ESU Generally, these fish only inhabit area during migrations. Middle Columbia River ESU may be found in residence. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit lies outside of action area for Snake River ESU Generally, these fish only inhabit area during migrations. Middle Columbia River ESU may be found in residence. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit lies outside of action area for Snake River ESU Generally, these fish only inhabit area during migrations. Middle Columbia River ESU may be found in residence. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit lies outside of action area for Snake River ESU Generally, these fish only inhabit area during migrations. Middle Columbia River ESU may be found in residence. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Project action is interrelated and interdependent to the proposed power plant construction. Future construction of a 28-mile segment transmission line may occur if current projects are completed. Impacts from those project where discussed in a previous BA and conclude "not expected to affect". No other development is envisioned associated with the proposed project action, therefore, no cumulative impacts are likely. **No effect.**

Table 2. Direct, Indirect, Short-term, Long-term, and Cumulative Impacts Summary for Threatened and Endangered Species Within the Action Area.

Species	Status	Direct Short-term Impacts	Indirect Short-term Impacts	Direct Long-term Impacts	Indirect Long-term Impacts	Cumulative Interrelated & Interdependent Impacts
Steelhead Trout-Upper Columbia River ESU (*Oncorhynchus mykiss*)	F-Endangered S-Candidate	Boundary limit lies outside of action area for Upper Columbia ESU. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit lies outside of action area for Upper Columbia ESU. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit lies outside of action area for Upper Columbia ESU. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Boundary limit lies outside of action area for Upper Columbia ESU. Generally, fish only inhabit area during migrations. Project action is isolated and has no surface connectivity to aquatic habitats via ephemeral or perennial streams. Impacts from project are improbable. **No effect.**	Project action is interrelated and interdependent to the proposed power plant construction. Future construction of a 28-mile segment transmission line may occur if current projects are completed. Impacts from those project where discussed in a previous BA and conclude "not expected to affect". No other development is envisioned associated with the proposed project action, therefore, no cumulative impacts are likely. **No effect.**
Bull Trout *(Salvelinus confluentis)*	F-Threatened S-Candidate	No suitable habitat exists within action area and access is restricted. No direct short-term impacts possible. **No effect**	No suitable habitat exists within action area and access is restricted. No indirect short-term impacts possible. **No effect**	No suitable habitat exists within action area and access is restricted. No direct long-term impacts possible. **No effect**	No suitable habitat exists within action area and access is restricted. No indirect long-term impacts possible. **No effect**	Project action is interrelated and interdependent to the proposed power plant construction. Future construction of a 28-mile segment transmission line may occur if current projects are completed. Impacts from those project where discussed in a previous BA and conclude "not expected to affect". No other development is envisioned associated with the proposed project action, therefore, no cumulative impacts are likely. **No effect.**

Table 2. Direct, Indirect, Short-term, Long-term, and Cumulative Impacts Summary for Threatened and Endangered Species Within the Action Area.						
Species	**Status**	**Direct Short-term Impacts**	**Indirect Short-term Impacts**	**Direct Long-term Impacts**	**Indirect Long-term Impacts**	**Cumulative Interrelated & Interdependent Impacts**
Bald Eagle *(Haliaeetus leucocephalus)*	F-Threatened S-Threatened	No suitable nesting habitat in action area. Likely fly over area and may hunt within project area; increased human activity during construction may discourage use. **Actions may affect but are not likely to affect.**	Construction disturbance could alter eagle prey behavior temporarily and potentially disrupt feeding opportunity. **Actions may affect but are not likely to affect.**	Possible collisions with transmission line may occur, however direct impacts are excepted to be low. **Actions may affect but are not likely to affect.**	Loss of habitat from access road construction may occur for small mammal and bird prey of the eagle. As eagles are predominately fish eaters, this effect is not likely to be adverse. **Actions may affect but are not likely to affect.**	Project action is interrelated and interdependent to the proposed power plant construction. Future construction of a 28-mile segment transmission line may occur if current projects are completed. Impacts from those project where discussed in a previous BA and conclude "not expected to affect". No other development is envisioned associated with the proposed project action, therefore, no cumulative impacts are likely. **No effect.**
Ute ladies' tresses plant (*Spiranthes diluvialis)*	F-Threatened S-Threatened	Not identified as occurring in project or action areas; based upon habitat preferences its occurrence is unlikely in this area. Therefore, construction activities are not likely to affect this species. **Actions may affect but are not likely to affect.**	Not identified as occurring in project or action areas; based upon habitat preferences its occurrence is unlikely in this area. Therefore, construction activities are not likely to affect this species. **Actions may affect but are not likely to affect.**	Not identified as occurring in project or action areas; based upon habitat preferences its occurrence is unlikely in this area. Therefore, the habitat destruction that would be occupied by access roads would not likely affect this species. **Actions may affect but are not likely to affect.**	Not identified as occurring in project or action areas; based upon habitat preferences its occurrence is unlikely in this area. Therefore, the habitat destruction that would be occupied by access roads would not likely affect this species. **Actions may affect but are not likely to affect.**	Project action is interrelated and interdependent to the proposed power plant construction. Future construction of a 28-mile segment transmission line may occur if current projects are completed. Impacts from those project where discussed in a previous BA and conclude, "will not affect". No other development is envisioned associated with the proposed project action, therefore, no cumulative impacts are likely. **No effect.**

4.2 DIRECT IMPACTS

4.2.1 FISH AND AQUATIC HABITATS

Critical habitat within the action area for federally listed salmonids is limited to the migration corridors for Snake River sockeye salmon, chinook salmon, Upper Columbia River and Snake River steelhead trout, and bull trout. Only Middle Columbia River steelhead trout have ESU boundary limits within the action area.

The proposed construction of the Wallula-Smiths Harbor transmission line does include portions of the Walla Walla and Columbia Rivers within its two-mile action area. However, there is no direct surface connectivity i.e. irrigation canals, waterways, ephemeral creeks, etc. between the site and these rivers (Smayda 2001a). The nearest potential construction to a body of water with critical habitat designation will be the termination of the transmission line at the Wallula Substation. At this point impacts from the power project will be approximately 800 feet from the Lake Wallula stretch of the Columbia River. The net effect of this proposed action will be to maintain existing conditions (Table 3). Because of the spatial isolation for the majority of the construction and lack of conveyance to the rivers the proposed actions are not likely to have any direct adverse affects the listed threatened or endangered fish or their critical habitat.

4.2.2 BALD EAGLES

Construction for this project could cause short-term temporary behavioral avoidance of the area due to increased activity, but should not involve overly excessive noises such as blasting. The bald eagle can be expected to frequent the project area on rare occasion, particularly as a fly-over migrant to feeding grounds on the Columbia and Walla Walla Rivers during the winter months. However, bald eagles wintering along the Columbia River in the project vicinity frequent perches near U.S. Highway 12, which suggests an apparent habituation to traffic noise. The threshold for noise disturbance has not been established for the eagle, although some habituation can occur, it cannot be assured.

The construction of the switchyard and transmission line will result in an increase of human presence in the project vicinity. Studies suggest that bald eagles can become tolerant of human presence and activity, and particularly the interaction with vehicles (Stalmaster and Kaiser 1998, Skagen 1980). The additional traffic and human presence from the project construction is not expected to adversely affect wintering bald eagles. Short-term direct impacts to bald eagles nests are limited because no nest locations have been observed, curtailing the possibility of abandonment from disturbance.

Collision with transmission lines is not a major source of mortality for raptors (Olendorff and Lehman 1986). Direct impacts to bald eagles are expected to be low.

The Wallula-Smiths Harbor transmission line route occurs in open shrub-steppe environments, which eliminates the necessity of tree removal. The location for the

Table 3 Pathways and Indicators Used to Evaluate Effects on Salmonids, and the Net Effects of the Actions on Relevant Pathways and Indicators.

Pathway	Indicators	Effects of Action		
		Improve[1]	Maintain[2]	Degrade[3]
Construction	Noise		X	
Disturbances	Entrainment		X	
	Stranding		X	
	Water quality (turbidity, etc.)		X	
Long-Term	Turbidity		X	
Water Quality	Chemical contamination/nutrients		X	
	Temperature		X	
	Dissolved oxygen		X	
Stormwater	Stormwater quality/quantity		X	
Sediment	Sedimentation sources/rates		X	
	Sediment quality		X	
Habitat	Fish access/refugia		X	
Conditions	Depth		X	
	Substrate		X	
	Slope		X	
	Shoreline		X	
	Riparian conditions		X	
	Flow and hydrology/current patterns/salt-freshwater mixing patterns		X	
	Overwater structures		X	
	Disturbance		X	
Biota	Prey-epibenthic and pelagic zooplankton		X	
	Infauna		X	
	Prey-forage fish		X	
	Aquatic vegetation		X	
	Nonindigenous species		X	
	Ecological diversity		X	

1 Action will contribute to long-term improvement, over existing conditions of the indicator

2 Action will maintain existing conditions.

3 Action will contribute to long-term degradation, over existing conditions of the indicator

switchyard may necessitate the removal of a few trees. However, these trees do not provide observation points for congregations of waterfowl or other prey sources and are not considered suitable perch habitat. Similarly, the removal of the cottonwood trees of the Boise Cascade tree farm is not expected to impact perch habitat.

Ultimately, no critical habitat will be affected for the bald eagle and no direct take will occur. The significance of behavioral avoidance by eagles in the long-term (if it occurs), would be minor because multiple routes to and from principal feeding grounds of the eagle will be maintained.

4.2.3 Ute Ladies Tresses

No suitable habitat for Ute ladies tresses occurs within the project site. However, wetland habitats do occur in the action area along irrigation ponds to the north of the transmission line near the terminus. The majority of these wetland habitats are dominated by a dense growth of non-native weeds and native plant species. Furthermore, no plant species normally associated with potential habitat for Ute ladies tresses were identified during field surveys.

Ute ladies tresses were not identified as occurring in the project or action areas during field surveys. Based upon habitat preferences, its occurrence is unlikely in this area. Habitat losses that would occur from road and switchyard construction would not be likely to adversely affect this species. Therefore, the proposed actions are not likely to have any direct adverse affects to this plant species or to its critical habitat.

4.3 Indirect Impacts

4.3.1 Fish and Aquatic Habitats

Because of the spatial isolation for the majority of the construction and lack of conveyance to the rivers, the proposed actions are not likely to have any indirect adverse affects the listed threatened or endangered fish or their critical habitat. Furthermore, the daily operations and maintenance activity at the switchyard are not expected to have any indirect impacts to these fish or their habitats.

4.3.2 Bald Eagles

Temporary construction disturbance could cause some indirect short-term impacts via avoidance of the project areas by bald eagle prey. This affect is expected to be minimal since bald eagles do little hunting within these areas.

Long-term indirect impacts to the bald eagles are expected to be minimal. Habitat loss to small prey (e.g. rodents) from road and switchyard construction is negligible. Furthermore, as bald eagles are predominately fish eaters, this effect is not likely to be adverse.

4.2.3 UTE LADIES TRESSES

Ute ladies tresses' were not identified as occurring in the project or action areas during field surveys. Furthermore, no potential habitat for Ute ladies' tresses, are present in the action area The proposed actions are not likely to have any indirect adverse affects Ute ladies' tresses or to its critical habitat.

4.4 CUMULATIVE IMPACTS

4.4.1 CUMULATIVE EFFECTS OVERVIEW

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological assessment. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Endangered Species Act.

The largest contributors to any possible cumulative impacts within this action area arise from proposed elements to complete the BPA's proposed Wallula Power Project. These elements are interrelated and interdependent to the completion of the Wallula-Smiths Harbor transmission line segment. These include the construction of the Wallula Power Generation Plant and upgrading the 28-mile Smiths Harbor-McNary 500-kV transmission line. The project elements for the Wallula Power Generation Plant are discussed in detail in the Biological Assessment completed by Smayda Environmental Associates, Inc. (Appendix D) and are the basis for much of the cumulative impact assessments. Furthermore, the 28-mile Smiths Harbor-McNary 500-kV transmission line is discussed in the Wallula Power Project and Wallula-McNary Transmission Line Project, Draft Environmental Impact Statement (BPA and WSEFSEC 2002) and is the basis for relevant cumulative impact assessment evaluations.

The following subsections provide a brief summary of the project elements that are interrelated and interdependent with the subject Biological Assessment.

Proposed Project – Wallula Power Plant and Associated Facilities (Laterals)

The construction of the Wallula Power Generation Plant consists of the plant facilities and the natural gas and makeup water supply lines (project laterals). The proposed power plant is to occupy approximately 64 acres of a 175-acre parcel located at the initiation of the Wallula-Smiths Harbor transmission line segment. The generation plant is approximately 8 miles south of the City of Pasco, 2 miles north of the unincorporated community of Wallula, and 7 miles southeast of the unincorporated community of Burbank. The project site is within the southern half of Section 34, Township 8 North, Range 8 East. Lake Wallula (the McNary Pool reach of the Columbia River) is located approximately 800 feet to the west. Plant structures include the stream turbine building, four heat recovery steam boilers and exhaust stacks, two sets of cooling towers, storage tanks, switchyard, one stormwater detention pond, and two evaporation ponds. The tallest structures in the power plant will be the exhaust stacks at 175 feet in height.

The makeup water supply line will extent south from the power plant site to the southeast corner of Section 3, T7N, R31E, and would continue south along the section line onto the Boise Cascade Wallula Mill tree farm. Within the tree farm, the pipeline will link to five wells in the southwest corner of Section 11, T7N, R31E and five wells in the eastern half of Section 14, T7N, R31E. This pipeline will be approximately 4.6 miles in length and will be buried for its entire length.

The Natural Gas pipeline consists of a 5.9 mile, 20 inch diameter pipeline buried along its entire route. This pipeline will follow the same route and share the same underground corridor as the makeup water supply pipeline up to their intersection with Wordon Road. From this point the natural gas pipeline will extent east-southeast to the tap point with the existing Pacific Transmission-Northwest (GTN) natural gas pipeline, about one mile north of the Walla Walla River (Appendix D, Figure 3).

Proposed Project - Smiths Harbor-McNary 500-kV Transmission Line

The Smiths Harbor-McNary 500-kV transmission line would interconnect the new Smiths Harbor Switchyard to the existing McNary Substation. This transmission line would parallel the existing 500-kV Bonneville transmission line. As currently proposed, the new transmission line would be constructed at a distance of approximately 200 feet on the west and north side of the existing transmission line. Approximately 140 tower structures would be required for this segment of transmission line.

Proposed Project – Lower Monumental-McNary Re-conductor

This project would involve a segment of the Lower Monumental-McNary 500 kilovolt (kV) line between towers 37/5 and 38/4, where the line crosses the Wallula Habitat Unit of the McNary Wildlife Refuge. The BPA contractor will remove the old conductor and replace it with a new twin conductor bundle like that already installed on other sections of this line. Stringing equipment will be set up at both ends of this segment to remove conductor. The work will require access to each structure to change hardware. No new towers are planned. This work is planned for mid-September and should be completed by October 4, 2002. Neither the new nor the replaced conductor is expected to touch or disturb the ground. Implosive devices will be used to fuse the ends of the new conductor to existing conductor, which will cause limited short term noise disturbance.

4.4.2 Fish and Aquatic Habitats

This project action is interrelated and interdependent to the proposed power plant construction. In addition, future construction of a 28-mile segment transmission line may occur if additional proposed generation projects in the region are completed. Impacts from the power plant project are described in the BA developed for that project (Appendix D). That BA concluded, “construction and operation of the proposed power plant and its laterals is not expected to affect listed fish species” (Smayda 2001a). Even though the project elements discussed in this BA are spatially isolated from waterways, the footprint for the proposed power plant is closer to the Columbia River and sedimentation from construction practices must be considered. In contrast, the isolation

and lack of direct surface connectivity would safeguard aquatic habitats from construction of the natural gas and makeup water pipelines as well as the possible construction of the 28-mile Smiths Harbor-McNary 500-kV transmission line. No other development is envisioned associated with the proposed project action, therefore, no cumulative impacts are likely.

4.4.3 BALD EAGLE

The construction and operation of the Wallula Power Plant will result in the removal of the irrigated crop circle and agricultural ponds on the project site. Smayda (2001a) notes that the loss of this waterfowl habitat at the project site is not expected to affect wintering bald eagles. No water bodies supporting waterfowl are located along the natural gas and water pipeline corridors. The proposed construction of these elements is therefore not expected to affect bald eagles.

The irrigated ponds of the Wanaket Wildlife Area and the Wallula Habitat Unit of the McNary Wildlife Refuge are found along the proposed Smiths Harbor-McNary 500-kV transmission line. These two areas do support waterfowl, however no bald eagle nests were sighted in either area during two separate visits in 2001 and 2002. Use of these areas by bald eagles is predominantly migrant birds wintering along the Columbia and Walla Walla Rivers. A majority of this 28-mile segment of transmission line segment would be well away from any water body and use by bald eagles would be very limited. The proposed construction of these elements is therefore not expected to adversely affect bald eagles.

The noise caused by implosive devices with the re-conductor project will occur in the early fall when bald eagles are not likely to be present in the area.

As previously discussed, collision with transmission lines is not a major source of mortality for raptors (Olendorff and Lehman 1986). The addition of new transmission line towers for the Smiths Harbor-McNary 500-kV transmission line adjacent to the current transmission line route should not significantly increase collision rates nor should current flight paths be altered. Smayda (2001a) indicates that even though the cooling towers for the proposed power generation plant are 175 feet tall, the project structures are not expected to impede the ability of bald eagles to fly through the project vicinity.

This project action is dependent on the completion of the Wallula Power Generation Plant and is interrelated to and interdependent on the proposed power plant construction. Additionally, construction of the 28-mile Smiths Harbor-McNary segment transmission line may occur in the future if these projects are completed. No other development is envisioned associated with the proposed project action. The project has no interrelated or interdependent elements to our knowledge that would cumulatively affect the eagles' ability to forage along or access the river corridors.

4.4.4 UTE LADIES TRESSES

None of the surveys completed for any portion of the Wallula Power Project has documented the presence of the Ute ladies tresses within this action area. No wetland habitats, and no potential habitat for Ute ladies' tresses, are present in the action area. The additional loss of potential habitat for this orchid species from the power plant and its laterals or the Smiths Harbor-McNary transmission line is not expected to impact this plant.

- Construct during dry season to avoid potential impacts to water quality and listed and candidate aquatic species that may utilize habitats downstream of the project area.

- Incorporate appropriate sedimentation control measures where applicable.

- Stop work during construction if bald eagles are observed in the action area. Resume work if the bald eagle(s) leave the area or, if they remain in the action area, a biologist or environmental monitor determines the work would not interfere with the bald eagle(s).

- Have a trained biologist/botanist reexamine project footprint prior to construction to prevent avoidable losses.

- Allow or enhance recovery of shrub-steppe habitat in project area where practicable.

- Ensure compliance with the spill prevention plan, and monitor stormwater per best management practices (e.g., erect silt-fences, etc.).

6.1 DEFINITIONS

NMFS and USFWS guidelines for the preparation of biological assessments state that a conclusion of "may affect, but is not likely to adversely affect" is appropriate when, "the effects on the species or critical habitat are expected to be beneficial, discountable, or insignificant". Insignificant effects, in the NMFS/USFWS definition, "…relate to the size of the impacts and should never reach the size where take occurs…[One would not expect to]…be able to meaningful measure, detect, or evaluate insignificant effects." Furthermore, these guidelines state that a conclusion of "no effect" is the "appropriate conclusion when it is determined that the proposed action will not affect listed species or critical habitat".

6.2 FISH AND AQUATIC HABITATS

Construction and operation of the proposed Wallula-Smiths Harbor 500-kV transmission line and Smiths Harbor Switchyard are not expected to impact any threatened or endangered salmonids. Construction of the project facilities is isolated from aquatic critical habitats. Furthermore, no surface water connections exist between project sites and the Columbia and Walla Walla Rivers. Therefore, a conclusion of **no effect for Snake River sockeye salmon, spring/summer and fall Snake River and Upper Columbia River chinook salmon, Snake River and Upper/Middle Columbia River steelhead trout, and Columbia River Basin bull trout is proposed for this project.**

6.3 BALD EAGLES

Wintering bald eagles that utilize the river shorelines in the project vicinity are not anticipated to undergo any significant impacts from the project construction and operations. Suitable nesting sites have not been documented within the project action area. Sightings of bald eagles documented during the 2000-2001 surveys were located at distances of 600 feet or greater from the project sites. Temporary construction and long-term traffic disturbance could cause avoidance of the area by the bald eagle during heavy use periods. However, multiple routes to and from principal feeding grounds of the eagle will be maintained. This BA concludes that the proposed **actions may affect, but are not likely to adversely affect bald eagles. Furthermore, the proposed action will result in no adverse modification or destruction of designated critical habitat for this species.**

6.4 UTE LADIES TRESSES

Construction and operation of the proposed power project is not expected to affect the threatened species Ute ladies' tresses. Suitable habitat for this species is not found within the project vicinity. Botanical surveys of the project's action area revealed no occurrences of this orchid species. However, due to the fact that surveys were not conducted during Ute ladies' tresses blooming season, a conclusive determination of its presence can not be made. Therefore, this BA concludes that the proposed **actions may affect, but are not likely to adversely affect, Ute ladies' tresses.** Furthermore, the proposed action will result in **no adverse modification or destruction of designated critical habitat for this species.**

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APPENDIX A

LETTER FROM SUSAN B. MARTIN, FIELD SUPERVISOR, USFWS UPPER COLUMBIA FISH AND WILDLIFE OFFICE, SPOKANE WA 99206, RE: UPDATED SPECIES LIST FOR THE WALLULA POWER PROJECT

Appendix A
USFWS Letter Dated August 29, 2001

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Upper Columbia Fish and Wildlife Office
11103 E. Montgomery Drive
Spokane, WA 99206

August 29, 2001

Kathleen W. Smayda
Smayda Environmental Associates, Inc.
139 NE 61st Street
Seattle, Washington 98115

Subject: Updated Species List for the Wallula Power Project, Walla Walla County, Washington (File #870.2300)

Reference Number: 1-9-01-SP-0687: Cross Reference: 1-9-01-SP-85

Dear Ms. Smayda:

Per your August 22, 2001, request, the U.S. Fish and Wildlife Service (Service) is writing to update the November 7, 2000, species list FWS 1-9-01-SP-85 for the subject project. There have been changes to this list. Our records indicate that the following listed species may occur in the vicinity of the project and could potentially be affected by it:

LISTED

Threatened
Bald eagle *(Haliaeetus leucocephalus)*
Bull trout *(Salvelinus confluentus)*
Ute ladies'-tresses *(Spiranthes diluvialis)*

This letter officially updates the previous list, and provides you with a new reference number, 1-9-01-SP-0687. You should refer to this species list number in all subsequent correspondence. This update fulfills the requirements of the Service under section 7(c) of the Endangered Species Act of 1973 (Act), as amended.

Information regarding Federal agency obligations under the Act, biological assessments, and candidate species has been provided to you in previous correspondence from this office. If you have questions, please contact Carrie Cordova in this office at (509) 893-8022. Thank you for your efforts to protect our nation's species and their habitats.

Sincerely,

Suzanne Audet

For Supervisor

c: Rick Donaldson, UCFWS, Spokane
WNHP, Olympia
WDFW, Region 1

APPENDIX B

WALLUA-MCNARY TRANSMISSION LINE: BIOLOGICAL SURVEYS, SUMMARY REPORT FOR WILDLIFE. CONDUCTED MAY 7-11 2002.

APPENDIX B

WALLULA-MCNARY TRANSMISSION LINE

1. BIOLOGICAL SURVEYS -- SUMMARY REPORT

[by Bob Honig, 14 May 2002]

1.1. OVERVIEW

ENTRIX conducted biological surveys on the proposed Wallula-McNary transmission line route and access roads on 7-11 May 2002. The goals were to assess the presence of listed (endangered and threatened) plants and animals, and to record land use types along the portions of the project that previously had not been surveyed.

The focuses were:

- the previously surveyed alignment (200-foot corridor).
- a new 5.1-mile alignment (200-foot corridor) from the start of the route to the proposed switching station;
- a new option (200-foot corridor) from the Power City wetlands to the end of the route at the McNary Substation; and
- all proposed access roads (20-foot corridor), other than public access roads, that are not within the previously surveyed 200-foot corridor.

The biological survey crew ranged from 3-5 people (Dave Durofchalk, Bob Honig, Marlene Heller, Erin Cunningham, Megan Herkelrath). Because of the length to be surveyed (approximately 33 miles of transmission line alignment plus access roads) in a very short time (5 days), we divided our crew at times in order to increase our coverage and be able to finish essentially all the target areas in the available time; only 2 people surveyed some areas. Depending on vegetation cover and number of people at a given time, our visual coverage was not 100% of the 200-foot corridor ground surface. In general, we only made one pass over a given length of corridor --we simply did not have time to do more.

In addition, we drove all driveable proposed access roads.

We skipped some agricultural lands (those with bare, recently tilled soil) because they would as initial inspections by vehicle and walking one field (approximately 0.5 miles long) indicated these would be totally barren. Thus we feel confident they do not support any of the listed species however, see comments on Streaked Horned lark, below).

There are just a few short areas that we did not get to -- I will mark what was and was not surveyed on the large maps provided by BPA when I am provided with extra copies.

I have not yet received Marlene's field notes, so any details in those will not be included in the following summary report.

1.2. LAND USE

GPS reading were taken for land use changes along all access roads that did not parallel the proposed transmission line alignment, as well as for the new 5.1-mile transmission line alignment at the beginning of the route and the new option at McNary. For access roads paralleling or roughly paralleling the proposed transmission line alignment (either immediately adjacent to or near that alignment), no GPS readings were taken for land use if the land use was the same as that along the previously surveyed 200-foot transmission line corridor (this was essential in order to cover the project facilities in the time available) -- land uses were in fact identical to the parallel line in essentially all locations; the data for these access road can be retrieved from the previous ENTRIX surveys.

1.3. VEGETATION

Target plant species were Gray Cryptantha, Beaked Cryptantha, and Prairie Lupine. The references that we obtained from the Whitman College library in Walla Walla were absolutely essential to our performing the survey work for these species; without them, the plant surveys would have been impossible.

Dave Durofchalk will be preparing the summary report on vegetation.

1.4. WILDLIFE

Target species were based on those listed in Section 3.6.1.1 of the DEIS for the Wallula Power Project and Wallula-McNary Transmission Line Project (February 2002). We did not have available the ER that ENTRIX produced for the transmission line, so I do not know if there is a more focused list available.

A list of all wildlife species observed on or near the proposed transmission line alignment and access roads can be found in Table 1 at the end of this section.

1.4.1. Birds

Observations follow. Note that the survey was during the spring migration, and some breeding birds may not yet have arrived on the breeding grounds yet.

a) Aleutian Canada Goose

A Canada Goose was observed in one of the potholes (no GPS taken). It is not known if this was the Aleutian subspecies, however it did not appear especially large.

b) American White Pelican

American White Pelicans were observed flying over the project area, including just east of the culvert site. None were observed on the ground or in potholes; however it is possible they may occasionally use the potholes.

c) Caspian Tern

A single Caspian Tern was seen flying to the west over the proposed alignment at Madame Dorion Park just before sunset on 11 May -- it was not interested in the habitat on the corridor at that location.

d) Ferruginous Hawk and Golden Eagle

A Ferruginous Hawk was observed diving on a juvenile Golden Eagle along Access Road AR-41-1 (GPS Waypoint 116).

e) Grasshopper Sparrow

None observed; however a single sparrow (possibly short-tailed like the Grasshopper Sparrow) was observed diving into the grass in a field just east of the eastern end of AR-57-1 about 0.5 miles east of Highway 207. Grasshopper Sparrow cannot be ruled out. (I know exactly where this is -- a green grassy field with a stream running through it along the proposed transmission line corridor, with lots of cows grazing, just east of the steep rock face east of the highway -- but I don't have Marlene's notes yet, so at the moment I can't tell you which GPS Waypoint.)

f) Loggerhead Shrike

Three sightings: 1 just west of Tower 1-50-1; .1 on Tower 1-48-2; 1 along AR-41-1.

g) Long-billed Curlew

Heard while we were on the proposed corridor -- the bird was quite a distance away. (Marlene's notes will have the GPS Waypoint #).

h) Streaked Horned Lark

Numerous Horned Larks wee observed in the agricultural fields between Hatch Grade Road and Juniper Canyon. I was able to get good, close looks at 4 of them -- none had streaked underparts. I believe that this is the distinguishing characteristic of the listed subspecies, but I have not seen a description of that subspecies. This should be checked before making any conclusions about the Horned Larks, which were quite common in the agricultural fields that wee bare soil, evidently having been recently tilled.

i) Swainson's Hawk

Two sightings, if I recall accurately: 1 soaring near AR-61-3; for the other I will need to see Marlene's notes.

j) Bald Eagle
Common Loon

Forster's Tern
Lewis' Woodpecker
Merlin
Northern Goshawk
Olive-sided Flycatcher
Oregon Vesper Sparrow
Prairie Falcon
Sage Grouse
Sage Sparrow
Sage Thrasher
Snowy Plover
Tricolored Blackbird
Vaux's Swift
Western Burrowing Owl
Willow Flycatcher
Yellow-billed Cuckoo
Yellow-breasted Chat

None of these species were observed during the 7-11 May 2002 surveys.

1.4.2. Mammals

Many of the listed mammals are nocturnal, and nocturnal surveys were not part of our scope. They all are somewhat secretive. In addition, we did not have the expertise to accurately identify burrows, tracks, or scat. Therefore, I cannot make conclusive statements about any of the listed mammals. Further analysis of habitat requirements may shed some light on the likelihood of occurrence. Observations follow.

a) Black-tailed Jackrabbit

A number of observations -- GPS or nearby landmark info was taken for all. We observed this species in most fairly dense sagebrush-steppe; I would expect it to be present in most if not all such habitat.

b) Ord's Kangaroo Rat

One individual seen on the switchyard site (GPS, photographs); this individual was apparently sick as it was out in the daytime and allowed approach to within a few inches. Tracks were also observed at another location, along the proposed transmission line corridor (need Marlene's notes to get exact location).

c) White-tailed Jackrabbit

None observed, however at least 1 of the jackrabbits observed was not seen well enough to be identifiable to species.

d) **Fringed Myotis**
Long-eared Myotis
Pale Townsend's Big-eared Bat
Pallid bat
Small-footed Myotis
Yuma Myotis
Washington Ground Squirrel

None observed -- see introductory Mammals section notes.

1.4.3. Reptiles

No listed species observed. However, due to their secretive nature and the fast pace of our survey, I would be hesitant to make definitive conclusions on their presence or absence.

a) **Northern Sagebrush Lizard**
Striped Whipsnake

None observed -- see introductory Reptiles section notes.

1.4.4. Amphibians

Detailed aquatic habitat observations were not possible within our time frame. Definitive conclusions not possible. Review of habitat information may allow some conclusions to be made.

a) **Northern Leopard Frog**

One possible Northern Leopard Frog was heard giving an alarm call as it dove into the water of a pothole as I walked by (not GPS). The call was indistinguishable from that of the Southern Leopard Frog in Texas (the Northern Leopard Frog does not occur in Texas) -- however I do not know if the Northern Leopard Frog can reliably be identified by that call in the project area.

b) **Columbia Spotted Frog**
Oregon Spotted Frog
Western Toad
Woodhouse Toad

None observed -- see introductory Amphibians section notes.

Table 1:
Wildlife species observed on or near the proposed transmission line alignment and access roads, 7-11 May 2002.

Mammals

Ord's Kangaroo Rat	Eastern Cottontail	Mule Deer
Badger	Yellow-bellied Marmot	
Black-tailed Jackrabbit	Coyote	

Reptiles

Gopher Snake	Western Rattlesnake	unidentified lizards

Amphibians

Northern Leopard Frog ??

Birds

Pied-billed Grebe	Ring-necked Pheasant	Barn Swallow
American White Pelican	California Quail	Bewick's Wren
Double-crested Cormorant	Sora	House Wren
Great Blue Heron	American Coot	Marsh Wren
Canada Goose	Killdeer	Townsend's Solitaire
Wood Duck	Black-necked Stilt	American Robin
Gadwall	Long-billed Curlew	European Starling
Mallard	Ring-billed Gull	Yellow Warbler
Cinnamon Teal	California Gull	Lark Sparrow
Northern Shoveler	Caspian Tern (overflight)	Savannah Sparrow
Redhead	Rock Dove	Song Sparrow
Common Goldeneye	Mourning Dove	Lincoln's Sparrow
Osprey (overflight)	Great Horned Owl	White-crowned Sparrow
Northern Harrier	Downy Woodpecker	Lazuli Bunting
Sharp-shinned Hawk	Northern Flicker	Red-winged Blackbird
Swainson's Hawk	Western Kingbird	Western Meadowlark
Red-tailed Hawk	Loggerhead Shrike	Yellow-headed Blackbird
Ferruginous Hawk	Black-billed Magpie	Brewer's Blackbird
Golden Eagle	American Crow	Brown-headed Cowbird
American Kestrel	Common Raven	House Finch
Peregrine Falcon	Horned Lark	American Goldfinch
Gray Partridge	Bank Swallow	House Sparrow
Chukar	Cliff Swallow	

APPENDIX C

WALLUA-MCNARY TRANSMISSION LINE: BIOLOGICAL SURVEYS, SUMMARY REPORT FOR VEGETATION. CONDUCTED MAY 7-11 2002.

Appendix C

Wallula-McNary Transmission Line

Phase II Biological Survey - - Summary Report on Vegetation

by David Durofchalk, May 16, 2002

Overview

ENTRIX conducted reconnaissance level biological surveys on the proposed Wallula-McNary transmission line route and access roads on May 7 through May 11, 2002. The goal of the surveys were to assess the presence of listed sensitive (endangered and threatened) plants and animals, and to record land use types along portions of the project that had not been previously surveyed or due to timing required additional inspection.

The ENTRIX biological survey crew included Bob Honig, David Durofchalk, Marlene Heller, Erin Cunningham, and Megan Herkelrath. The survey focus included:

- The previously surveyed approximately 28-mile transmission line alignment (200-foot corridor);
- The new 5.1-mile alignment (200-foot corridor) from the start of the route at the proposed plant site to the proposed Smiths Harbor switchyard;
- New alignment Option #2 (200-foot corridor) west of the original proposed alignment from Power City to the McNary Substation (not indicated on maps); and
- All proposed access roads (20-foot corridor), other than the public access roads, that are not within the previously surveyed 200-foot corridor (indicated on BPA's GIS mapping of May 6, 2002 as yellow, purple, green, or red dashed lines).

A pedestrian field survey was conducted on approximately 33 miles of transmission line corridor. Due to the length to be surveyed in a relatively short period of time, the crew was sometimes divided to enable completion of primary target areas in the available time frame. Bob Honig was responsible for the wildlife surveys and David Durofchalk was responsible for the vegetation surveys. All five of the survey crew personnel provided visual coverage of the survey corridor, alerting Bob or Dave of specific observations/occurances. For the most part, the survey crew spread out equally along the width of the 200-foot survey corridor to provide the best visual coverage. Generally, only one pass was made over a given length of corridor. In addition to the pedestrian survey, a windshield survey was conducted on all proposed access roads that were driveable.

Survey work proceeded generally from west to east on May 7 through May 9, beginning at the McNary Substation in Power City and continuing to the Juniper Canyon. Survey work continued on May 10 at the proposed plant site to provide complete coverage of the new 5.1-mile alignment and access roads, continuing along the alignment in a southwest direction on May 11 toward Juniper Canyon. We skipped some agricultural lands and orchards where we felt confident that they did not support any of the listed species.

There were also a few short areas that we did not get to (see Bob's comments) including the area at the foot of Juniper Canyon where the transmission line would span the canyon and ground surface impacts would not be expected.

Field work was completed on Saturday, May 11, 2002 by Bob Honig, Marlene Heller and Megan Herkelrath. David Durofchalk and Erin Cunningham had to leave the field on Friday, May 10.

Land Use

For land use, GPS readings were taken for land use changes along all access roads that did not parallel the proposed transmission line alignment, as well as for the new 5.1-mile transmission line alignment at the beginning of the route and the Option #2 alignment at McNary. For access roads paralleling or roughly paralleling the proposed transmission line alignment, no GPS readings were taken for land use if the land use was the same as that along the previously surveyed 200-foot transmission line corridor. Land uses were identical to the parallel line in essentially all locations. The data for these access road where no GPS readings were recorded can be retrieved from the previous ENTRIX surveys where indicated on the photo alignment mapping.

Wildlife

For the wildlife survey, target species were based on those listed in Section 3.6.1.1 of the DEIS for the Wallula Power Project and Wallula-McNary Transmission Line Project (February 2002). Bob Honig has prepared the summary report on Wildlife (see Bob's comments).

Vegetation

For the botanical survey for the special-status species, target plant species were Grey Cryptantha (*Cryptantha leucophaea*), Beaked Cryptantha (*Cryptantha rostellata*), and Prairie Lupine (*Lupinus cusickii*). These target species were based on habitat requirements and historic record of special-status plant species in the project area as indicated in Section 3.4.1.3 of the DEIS for the Wallula Power Project and Wallula-McNary Tranmission Line Project (February 2002). Blooming periods for these species did not coincide with previous surveys.

Special-Status Plant Species

Grey Cryptantha (*Cryptantha leucophaea*) has been documented in the project area within the last 20 years, according to data provided by the Washington Department of Natural Resources Natural Heritage Program. Grey Cryptantha grows in loose, sandy soils and flowers in May and June. Based upon habitat requirements, Beaked Cryptantha (*Cryptantha rostellata*) and Prairie Lupine (*Lupinus cusickii*) may also occur in the project area. Beaked Cryptantha occurs in dry open places, sometimes with sagebrush, and flowers late April to mid-May. Prairie Lupine occurs in rocky, open slopes and areas that contain deposits of volcanic ash, and flowers May to June.

A list of all vegetative species observed during the May 2002 botanical survey is provided in the table at the end of this summary. A list of botanical references utilized for field identification of plants, including special-status species, is also included at the end of this summary.

On May 9 we identified what appeared to be a small colony of approximately 15 or more individuals of Beaked Cryptantha (*Cryptantha rostellata*) on the south face of rocky outcrop and grassland along the 200-foot-wide transmission line corridor east of where access road LM-JD-AR 57-2 joins the alignment (GPS coordinates N45.91795, W119.10702). Photographs detailing the plants were obtained.

On May 11 we identified what appeared to be Prairie Lupine (*Lupinus cusickii*). At least 9 individual plants were encountered in a 30-foot radius in a westerly-exposed sandy area of the transmission corridor, on the east side of the access road on the north side of the Walla Walla River, just east of Smiths Harbor (GPS coordinates N46.06270, W118.88606). Photographs detailing the plants were obtained.

These two plants were the only special-status plant species observed during the survey. No other special-status plants were identified in the course of the 5-day field reconnaissance survey. However, while the potential that the two special-status species exist on the project site, subtle differences at the specific and sub-specific level for both *Cryptantha rostellata* and *Lupinus cusickii* precluded a definitive positive identification. It is strongly suggested that a botanist with specific expertise in the definitive identification of these two species conduct a detailed site review at the identified location sites during the short flowering period of mid-May to June. Given the relatively small confined area where the special-status species were found, it is entirely possible to avoid disturbance to the plants by slight relocation of access road or transmission line towers, if necessary.

Master List of Plant Species Identified during Wallula Phase II Investigation

American three-square	*Scirpus americanus*	
Arrow-leaved balsamroot	*Balsamorhiza sagittata*	
Aster	*Aster* spp.	
Beaked cryptantha*	*Cryptantha rostellata*	*State Sensitive
Big sagebrush	*Artemisia tridentata*	
Bitterbrush	*Purshia tridentata*	
Bitterbrush	*Purshia tridentata*	
Bluebunch wheatgrass	*Agropyron spicatum*	
Bluegrass	*Poa* spp.	
Buckwheat	*Eriogonum* spp.	
Canada thistle	*Cirsium arvense*	
Cat's ear	*Hyochaeris radicata*	
Cattail	*Typha latifolia*	
Cheatgrass	*Bromus tectorum*	
Cheatgrass	*Bromus tectorum*	
Cleavers	*Galium aparine*	
Common burdock	*Arcticum minus*	
Common larkspur	*Delphinium nuttellianum*	
Common mullein	*Verbascum thapsus*	
Common teasel	*Dipsacus fullonum*	
Cottonwood	*Populus deltoides*	
Cultivated peppermint	*Mentha* spp.	
Dagger-pod	*Phoenicaulis cheiranthoides*	
Dandelion	*Taraxacum officinale*	
Desert parsley	*Lomatium grayi*	
Evening primrose	*Oenothera pallida*	
Fescue	*Festuca* spp.	
Fescue	*Festuca* spp.	
Fiddleneck	*Amsinckia* spp.	
Field pennycress	*Saxifraga occidentalis*	
Golden pea	*Thermopsis montana*	
Goldenrod	*Salidago* spp.	
Green rabbitbrush	*Chrysothamnus viscidiflorum*	
Grey rabbitbrush	*Chrysothamnus nauseosus*	
Hardstem bulrush	*Scirpus acutus*	
Hood's phlox	*Phlox hoodii*	
Hybrid poplar	*Populus* spp.	
Knapweed	*Centaurea* spp.	
Kochia	*Kochia scoparium*	
Lamb's quarters	*Chenopodium album*	
Locoweed	*Astragalus* spp.	
Milkweed	*Asclepias* spp.	
Mustard	*Brassica* spp.	

Orange globe mallow	*Sphaeralcea munroana*
Pacific willow	*Salix lasiandra*
Pineappleweed	*Matricaria discoidea*
Plantain	*Plantago lanceolata*
Prairie lupine	*Lupinus lepidus*
Prickly pear cactus	*Opuntia polycantha*
Purple loosestrife	*Lythrum salicaria*
Reed canarygrass	*Phalaris arundinacea*
Russian olive	*Eleagnus angustifolia*
Rye grass	*Secale cereale*
Sand dock	*Rumex venosus*
Sedge	*Carex* spp.
Shepherd's purse	*Capsella bursa-pastoris*
Smartweed	*Polygonum* spp.
Snowball	*Abronia elliptica*
Spikerush	*Eleocharis* spp.
Stinging nettle	*Urtica dioica*
Stork's bill	*Erodium cicutarium*
Tall white top	*Lepidium latifolium*
Thyme-leaved buckwheat	*Eriogonum thymoides*
Tumblemustard	*Sisymbrium altissimum*
Tumbleweed	*Salsola iberica*
Western yarrow	*Achillea lanulosa*
Wild onion	*Allium acuminatum*
Yarrow	*Achillea millefolium*
Yellow salsify	*Tragopogon dubius*
Yellow starthistle	*Centaurea solstitialis*

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APPENDIX D

WALLULA POWER PROJECT, BIOLOGICAL ASSESSMENT FOR TERRESTRIAL AND AQUATIC PLANTS AND ANIMALS. SMAYDA ENVIRONMENTAL ASSOCIATES, INCORPORATED, SEATTLE, WASHINGTON. SEPTEMBER 10 2001

Wallula Power Project

Biological Assessment for Terrestrial and Aquatic Plants and Animals

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September 26, 2001

Prepared for:

Wallula Generation, LLC

Prepared by:

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Wallula Power Project

Biological Assessment for Terrestrial and Aquatic Plants and Animals

September 26, 2001

1. Introduction

Wallula Generation LLC, proposes to develop of a 1,300 megawatt, natural gas-fueled combustion turbine power plant in Wallula, Walla Walla County, Washington. The Wallula Power Project is designed to provide low cost electric energy to meet the growing needs of the Northwest and other interconnected electric transmission areas where electric energy is needed.

The project site is located in the northwestern portion of Walla Walla County, approximately eight miles south of the city of Pasco, two miles north of the unincorporated community of Burbank. The property is within the southeastern quarter of Section 33 and southwestern quarter of Section 34, both located in Township 8 North, Range 31 East. The project site is bordered on the west by U.S. Highway 12 and on the east by the Union Pacific Railroad. Lake Wallula (the McNary Pool reach of the Columbia River) is located approximately 800 feet to the west. Project laterals include makeup water supply and natural gas pipelines that will extend southeast from the power plant site, 4.6 and 5.9 miles, respectively.

Figure 1 Wallula Power Project Vicinity Map shows the location of the proposed project and its laterals.

2. Description of Proposed Development

Project Site

Project facilities will occupy approximately 100 acres of the 175-acre parcel which is currently zoned industrial and designated 'IH, Heavy Industrial' in the existing land use plan for western Walla Walla County. The project site is currently developed for irrigated agriculture and has most recently been used for production of alfalfa. Adjacent land uses include the highway right-of-way, the Iowa Beef Processors, Incorporated slaughterhouse, the J.R. Simplot Company cattle feedlots, the Ponderosa Fibers of Washington de-inking plant, and the Boise Cascade Wallula Mill pulp and paper products mill. Irrigated annual crops and orchards are farmed immediately north of the project site.

insert figure 1; Wallula Power Project Vicinity Map

Figure 2 Vegetation Map of Project Site shows the habitats present on the project site and adjacent parcels of land to the north and south. **Table 1 Project Site Cover Type Descriptions** defines the cover type codes used on the vegetation map. The 175-acre project site is dominated by an agricultural crop circle (approximately 125 acres) currently cultivated with alfalfa. Abandoned orchards are present in three of the four corners of the project site (approximately 30 acres). Irrigated farming began on the project site in about 1978 (Chen-Northern 1993).

Table 1. Project Site Cover Type Descriptions

Map Code	Cover Type Description
AGa	Agriculture, irrigated annual cropland
AGo	Agriculture, irrigated orchards
AGd	Agriculture, developed lands
AGf	Agriculture, fallow lands
C	Canal or irrigation ditch
DSS	Disturbed shrub-steppe
IND	Industrial lands
OWi	Open water, irrigation created
PEMi	Palustrine emergent wetland, irrigation created
PFOi	Palustrine forested wetland, irrigation created
PSSi	Palustrine scrub/shrub wetland, irrigation created
R	Unpaved farm road
RR	Railroad

The primary irrigation supply pond is located in the northeast corner of the project site. The pond has a surface area of about three acres when full during the March to October irrigation season. A narrow band of vegetation (about one acre total area) consisting of Great Plains cottonwood (*Populus deltoides var. occidentalis*), honey locust (*Gleditsia* sp.), sandbar willow (*Salix exigua*), Russian olive (*Eleagnus angustifolia*), common cattail (*Typha latifolia*), and hardstem bulrush (*Scirpus acutus*) surrounds the pond.

Irrigation ponds and drainage ways are also located along the western edge of the project site. None of the irrigation structures are lined, and water-dependent vegetation has become established in these areas, through planting and natural colonization from nearby areas. Dominant species include Russian olive, Pacific willow (*Salix lasiandra*), Great Plains cottonwood, common cattail, hardstem bulrush, and purple loosetrife (*Lythrum salicaria*). Disturbed shrub-steppe habitat is present between the irrigation ponds on the western edge of the project site. Dominant grasses and forbs include cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola iberica*), yellow starthistle (*Centaurea solstitialis*), perennial pepperweed (*Lepidium latifolium*), kochia (*Kochia scoparia*), and Canada thistle (*Cirsium arvense*). Shrub species include big sagebrush (*Artemisia tridentata*), and both gray and green rabbitbrush *(Chrysothamnus nauseosus* and *C. viscidiflorus*). The western portion of the project site, exclusive of agricultural lands, totals approximately 16 acres.

insert figure 2; Vegetation Map

Construction of the power plant and associated facilities is scheduled to occur over a 24-month period. Clearing and grading of the project site will result in removal of vegetation from the majority of the site, including the trees surrounding the main irrigation pond northeast corner. A total of 100 acres will be used for placement of project facilities.

When complete, the Wallula Power Project will include the following structures: the steam turbine building housing four combustion gas turbine generators, four heat recovery steam boilers and exhaust stacks, two sets of cooling towers, storage tanks, switchyard, two stormwater detention ponds and two evaporation ponds. The tallest structures are the heat recovery steam boiler exhaust stacks, at 175 feet each. These stacks will be freestanding above the height of the adjacent steam turbine building. The steam turbine building and heat recovery steam boilers will be 98 feet tall. The cooling towers will be arranged in two rows of nine cells, approximately 600 feet long by 61 feet tall.

The small wetlands surrounding the irrigation ponds on the west side of the project site will be protected by wetland buffers, and no vegetation will be cleared within either the wetlands or their buffers. Over time, these wetlands are expected to become drier sites as a result of cessation of irrigation on the site. All other portions of the project site not occupied by project facilities will be reseeded to shrub-steppe habitat, emphasizing native plant species, upon completion of construction. Juniper trees (*Juniperus occidentalis*) may be planted as a wind and visual screen along the western edge of the project site adjacent to U.S. Highway 12.

Access Road

Access to the project site during construction will be achieved through a temporary access road on the project site and the adjacent Jaussaud property to the south. The access road will intersect U.S. Highway 12 at a temporary construction T intersection. Permanent access to the power plant will be constructed from Dodd Road, located to the north of the project site. After construction is completed, the temporary U.S. Highway 12 intersection will revert to a gated access as a second means of emergency access until such time as a permanent north-south parallel County roadway is developed. Once the County access road is completed, the temporary access road will be revegetated.

The temporary construction access road will pass through disturbed shrub-steppe habitat characterized by cheatgrass, knapweed (*Centaurea spp*.), Russian thistle, and perennial pepperweed. The permanent access road to the site will be located in an area currently farmed with alfalfa. This access road will be paved with asphalt.

Project Laterals

Figure 3 Vegetation Map of Project Laterals shows the proposed routing of the makeup water supply and natural gas pipelines.

insert figure 3; Vegetation Map of Laterals

Makeup Water Supply Pipeline

The proposed industrial makeup water pipeline will extend south from the southeast corner of the project site, then diagonally to the southeast corner of Section 3, T7N, R31E, and would continue south along the section line onto the Boise Cascade Wallula Mill tree farm. The pipeline will continue within the tree farm to link five existing wells in the southwest corner of Section 11, T7N, R31E and five existing wells in the eastern half of Section 14, T7N, R31E. The overall length of the industrial makeup water pipeline is approximately 4.6 miles from the project site to the southernmost Boise Cascade well. The pipeline will be buried for its entire length.

Habitat along the makeup water supply pipeline route is comprised of disturbed shrub-steppe and hybrid poplar stands. A high proportion of weedy non-native species intermixed with native shrubs characterizes the disturbed shrub-steppe habitat along the route. The dominant shrub species are big sagebrush, green rabbitbrush, and gray rabbitbrush. Cheatgrass is the dominant understory grass species, with occasional plants of bluebunch wheatgrass (*Agropyron spicatum)* and Idaho fescue (*Festuca idahoensis*). Russian thistle, Canada thistle, knapweed, and yellow starthistle are common.

The Boise Cascade tree farm stands are plantations of hybrid poplar grown on a seven-year harvest rotation. The dense stands are intensively maintained and few other plant species are present. Weedy plants that grow along the access roads adjacent to the stands include cheatgrass, Russian thistle, and perennial pepperweed.

Construction of the natural gas pipeline will be accomplished over an approximately three-month period. The pipeline trench will be excavated at multiple points in order to reduce the duration of construction and return the land to agricultural use as soon as possible. The pipeline will be buried 4 to 5 feet deep, using excavated material to backfill around the pipe. The disturbed areas will be seeded with native and appropriate non-native grasses and forbs to stabilize the soil. Assuming an average excavation and disturbance width of 75 feet, installation of the pipeline and tap site at the eastern terminus will temporarily disturb approximately 60 acres of habitat, about half of which is disturbed shrub-steppe, one quarter hybrid poplar stands, and one quarter existing utility corridor.

Natural Gas Pipeline

Natural gas for the power plant will be transported to the site via a 5.9-mile, 20-inch diameter pipeline. The proposed natural gas pipeline will extend from the southeast corner of the project site, south along the eastern boundary of the Jaussaud property, southeast to the southeast corner of Section 3 of T7N, R31E, and then south along the section line to the intersection with Worden Road. The natural gas pipeline and makeup water supply pipeline will be located in a common, underground utility corridor along this segment of the route. From this point, the natural gas pipeline will extend east-southeast adjacent to the farm road to the tap point with the existing Pacific Transmission-Northwest (GTN) natural gas pipeline, about one-mile north of the Walla Walla River.

The majority of the land affected by construction of the proposed natural gas pipeline is irrigated cropland. Vegetation within the crop circles reflects the annual crop that is seeded (primarily alfalfa, potatoes, and corn) or the weedy species present on fallow sites. Shrub-steppe habitat along the proposed natural gas pipeline route is restricted to the corners between crop circles and a few parcels of grazed land. This habitat is characterized by a high proportion of weedy non-native species intermixed with native shrubs. The dominant shrub species are big sagebrush, green rabbitbrush, and gray rabbitbrush. Cheatgrass is the dominant understory species. Russian thistle, Canada thistle, knapweed, and yellow starthistle are common.

Construction of the make-up water supply pipeline will occur over an approximately three-month period. Multiple sites will be excavated simultaneously in order to achieve this short construction duration. The pipeline will be buried 4 to 5 feet deep, and any roads that are cut during excavation will be repaired and returned to pre-construction condition. Excavated soil will be used to backfill the trench and the site will be revegetated with native and appropriate non-native grasses and forbs upon completion of construction. Assuming an average excavation and disturbance corridor width of 75 feet, the installation of the pipeline will temporarily affect about 4.5 acres of disturbed shrub-steppe habitat and 22 acres of hybrid poplar stands.

Electrical Transmission

Electrical transmission for the project will be designed, constructed, and owned by Bonneville Power Administration (BPA), and will be addressed in an environmental report prepared by BPA.

3. Listed and Proposed Species in the Project Vicinity

Information on federally threatened and endangered species and candidates for federal listing was obtained from the U.S. Fish and Wildlife Service (USFWS 2000b and 2001), Washington Department of Fish and Wildlife (2000 and 2001), and National Marine Fisheries Service (NMFS 2000). The USFWS responded to a request for updated listing of species on August 29, 2001. A copy of this letter is included as Appendix A.

The USFWS indicated that the following federally listed threatened species may occur in the project area (USFWS 2000b):

- Bald eagle (*Haliaeetus leucocephalus*)
- Bull trout (*Salvelinus confluentus*)
- Ute ladies' tresses (*Spiranthes diluvialis*)

These three species and other federally listed and proposed species that could potentially occur in the project area are described briefly below.

Brief Description of the Proposed/Listed Species Potentially Occurring in the Project Vicinity

Fish Species

Investigations of the project site and corridors for the natural gas pipeline, makeup water pipeline, and access road have confirmed that there is no direct connectivity of surface waters and runoff from the plant site and laterals to the waters of the Columbia River or the Walla Walla River (refer to Section 4 below). However, to ensure a comprehensive biological assessment of potential impacts on species listed under the Endangered Species Act of 1973 (ESA), the fish species known or suspected to occur in the Lake Wallula reach of the Columbia River and the lower reach of the Walla Walla River are briefly discussed. Appendix B provides more detailed information (biology, behavior, habitat preferences, etc.) about listed anadromous Pacific salmonids (*Oncorhynchus* sp.) that migrate through the Lake Wallula reach of the Columbia River.

Snake River Sockeye Salmon (Oncorhynchus nerka)

The National Marine Fisheries Service formally listed Snake River sockeye salmon as an endangered species under the ESA on November 20, 1991 (56 FR 58619). The limit of the evolutionarily significant unit (ESU) boundary for Snake River sockeye salmon is entirely within the State of Idaho. However, due to the potential presence of migrating sockeye at various times throughout the year, the mainstem Columbia River from the mouth up to the confluence with the Snake River has been designated as critical habitat for Snake River sockeye (58 FR 68543).

Snake River sockeye may travel through Lake Wallula during migration periods. Juvenile Snake River sockeye migrate from Redfish Lake in Idaho from April to May and adults migrate back to the lake from July through September (Waples and Johnson 1991). Snake River sockeye are considered lake-type sockeye, meaning they spawn in or near lakes. These fish tend to rear for 1 to 3 years prior to migrating to marine waters. Sockeye spend between 1 and 4 years in the ocean before returning to their natal streams to spawn (Gustafson et al. 1997). Like other Pacific salmon, sockeye require substantial cover, relatively high water quality, and low water temperatures (generally less than 15°C).

No rearing of Snake River sockeye salmon would be expected in the Columbia River in the vicinity of the project area. Therefore, presence of this species in Lake Wallula would be expected only for short periods during juvenile and adult migration.

Chinook Salmon (Oncorhynchus tshawytscha)

Both fall chinook and spring/summer chinook salmon populations of the Snake River were listed by NMFS as threatened species under the ESA on April 22, 1992 (57 FR 23458). In addition, NMFS listed Upper Columbia River spring chinook salmon as an endangered species on March 24, 1999 (64 FR 14308). The limits of the evolutionarily significant unit (ESU) boundaries for these populations are entirely outside of Lake Wallula. However, due to the potential presence of migrating chinook at various

times throughout the year, the mainstem Columbia River, including Lake Wallula, is designated critical habitat for all three chinook salmon ESUs (58 FR 68543 - revised in 64 FR 57399, 65 FR 7764).

Listed chinook salmon are present in the Columbia River adjacent to the project area during migration periods. Adult chinook salmon from the Snake River migrate through the Columbia River from May to October (includes both spring/summer and fall chinook populations). Upper Columbia River adult chinook salmon migrate from March through May (Mathews and Waples 1991, Waples, et al. 1991). The Majority of the Columbia River and Snake River chinook are thought to be "ocean-type" chinook, meaning that they outmigrate as subyearlings during the summer and fall after emergence (Mathew and Waples 1991, Waples et al. 1991, Myers et al. 1998).

Juvenile ocean-type chinook such as these tend to migrate quickly to the estuary, therefore, residence in Lake Wallula would be limited. Adults would also be expected to move rather quickly through Lake Wallula. There would be no expected rearing of listed chinook salmon in the vicinity of the project area.

Steelhead Trout (Oncorhynchus mykiss)

NMFS has listed three steelhead evolutionarily significant units (ESUs): Upper Columbia River ESU – endangered (62 FR 43937), Middle Columbia River ESU – threatened (64 FR 14517), and the Snake River Basin ESU – threatened (62 FR 43937). Critical habitat for all of these species has been designated to include the Columbia River reach near the proposed project site (65 FR 7764). However, the area is only considered a migration corridor for Upper Columbia River and Snake River Basin steelhead. Lake Wallula is within the boundary of the Middle Columbia River steelhead ESU.

The Middle Columbia River ESU supports both winter and summer runs of steelhead. In fact, only remaining inland winter-run steelhead population in the United States is thought to exist within this ESU. The Yakima and Klickitat rivers are the major producers of steelhead in the ESU; however, the Walla Walla River supports a summer-run population (West Coast Steelhead BRT 1999).

Adult steelhead from these ESUs generally migrate to their natal streams from September through late June with peak spawning occurring from May through July. Juvenile steelhead in the ESU rear in freshwater for one to two years before migrating to the ocean. Primary migration windows for steelhead through Lake Wallula are mid-April through mid-June for juveniles, and mid- March through mid-May and mid-June through mid-October for adults (USACOE 2000b).

Steelhead have the same basic habitat requirements as other Pacific salmon, including adequate cover, clean substrate, and generally cool water temperatures. Steelhead appear to be especially sensitive to water temperatures. Temperatures exceeding 17°C have been found to have a negative effect on juvenile steelhead populations (Frissell et al. 1992).

Bull Trout (Salvelinus confluentus)

The USFWS listed the Columbia River bull trout population segment as threatened on June 10, 1998 (63 FR 31647). This listing includes all bull trout in the Columbia River watershed from the mouth to the Canadian border. The primary constraint on bull trout production noted by USFWS was the fragmented nature of bull trout habitat throughout the basin (WDFW 1998).

Bull trout have four distinct life history patterns: the resident or non-migratory type, fluvial fish that migrate within the river system, adfluvial fish that migrate between river and lake habitats, and anadromous (Goetz 1989).

Bull trout display a high degree of sensitivity at all life stages to environmental disturbance and have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). The health of bull trout populations appears to be directly associated with the amount of cover, channel stability, substrate composition, temperature, and migratory corridors provided by a river basin (Rieman and McIntyre 1993). Bull trout require pristine waters with clean gravel and optimal water temperatures from 2-10°C. Water temperatures greater than 15°C are thought to produce a thermal barrier for most bull trout (63 FR 31647, Goetz 1989).

There are no documented populations of bull trout in the Columbia River between the Snake and Walla Walla rivers (USACOE 2000a). Bull trout are known to occur in the upper reaches of the Walla Walla River and tributaries of the Snake River. However, lower reaches of both rivers have been documented as exceeding water quality parameters for temperature, which would likely limit bull trout migration in these streams (DOE 2000). Bull trout are not found near the mouth of the Walla Walla River (USACOE 2000a), and are not expected to occur in the Lake Wallula reach of the Columbia River.

Terrestrial Species

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle is listed as threatened under the ESA. The Federal Government has protected bald eagles since 1967 (32 FR 4001). In the state of Washington, bald eagles have been managed as a threatened species since 1978 (43 FR 6230). Since 1963, the species has increased by more than tenfold, which prompted the U.S. Fish and Wildlife Service to propose the removal of bald eagles from the list of threatened and endangered species in 1999 (64 FR 36453). To date, no decision has been made regarding this proposal; therefore, all protections afforded to the species from their threatened status remain intact.

The Wallula Power Project area is thought to provide only wintering habitat for bald eagles. Several unsuccessful nesting attempts have been documented in the project vicinity; however, there are no documented active nests (USACOE 2000a).

Bald eagle surveys were conducted in the proposed project area from November 2000 through March 2001. During this period, a total of 71 bald eagles were sighted during the fourteen survey dates. Of these, 42 of the bald eagles were juveniles and 29 were adults (SEA 2001). This age distribution is consistent with other studies of bald eagles in the area (Fitzner et al. 1980). However, other studies conducted in the middle Columbia River area have found that adults generally outnumber juveniles (Wood 1980, Fielder and Starkey 1987). Larger numbers of juveniles has generally been associated with an abundant prey base, increasing the chances of success for the less experienced hunters (Fitzner et al. 1980).

On three occasions, bald eagles were observed flying over the proposed project site; however, none were observed perching or hunting in this area. In addition, on one occasion bald eagles were observed flying over the location of the proposed natural gas and industrial makeup water supply line. No observations of eagles perching or hunting over the project laterals were recorded (SEA 2001).

The majority of the bald eagles sighted during the surveys were observed perching in mature cottonwood trees along the Columbia River and Walla Walla Rivers within the boundaries of management units of the McNary National Wildlife Refuge. Individuals were also observed perching on fence posts, the ground, and actively hunting at the water treatment lagoons of the Simplot Feedlot located to the east of the proposed project area. These locations coincide with the highest abundance of waterfowl, a primary food source for wintering bald eagles in this area (Fielder 1982). In fact, some studies have found that during the late winter, waterfowl can comprise between 80 to 90 percent of the bald eagle's diet. The remainder of the food sources include fish, carrion, small mammals, and other birds (Fielder and Starkey 1980, Fielder 1982). The peak abundance of bald eagles in the project vicinity occurred during the months of February and March, which is consistent with other bald eagle studies conducted in the area (Fielder and Starkey 1987, Wood 1980, Fitzner et al. 1980).

Another factor to consider regarding the ecology of wintering bald eagles is the use of communal night roosts. These roosts are used perennially and are typically located near areas with plentiful food sources. The roosts usually contain special habitat features, such as snags or trees that are older and larger than other trees in the area (Adams et al. 2000). Anywhere from a few individuals up to 50 or more may utilize a single roost (Wood 1980, Adams et al. 2000). The surveys conducted at the project included late afternoon and early morning observations. Small congregations of bald eagles (up to five) were noted within the McNary National Wildlife Refuge (SEA 2001); no evidence of early or late day flight patterns to or from specific stands of trees were noted. Neither the project site, nor the laterals, contain adequate tree stands to serve as bald eagle night roosts.

***Ute ladies' tresses* (*Spiranthes diluvialis*)**

On January 17, 1992, the U.S. Fish and Wildlife Service listed Ute ladies' tresses, *Spiranthes diluvialis*, as threatened under the Endangered Species Act (57 FR 2048, January 17, 1992). This perennial orchid has been documented in eight states: Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington and Wyoming (USFWS 1998a). The Nevada population has not been relocated since it was initially reported in 1936 (Moseley 1998). In 1997, a small population of Ute ladies' tresses was documented in a wetland meadow adjacent to Wannacut Lake in Okanogan County, Washington. The Washington population is located over 200 miles north of the Wallula Power Project site. This population consists of fewer than 20 individual plants (Ohlson 2000).

The general habitat of *Spiranthes diluvialis* is considered to be broad, low-elevation intermontane valley and plains. It typically occurs at elevations below the coniferous forest vegetation zone in steppe, shrub-steppe, or pinyon-juniper woodland zones. Some populations have been found at the transition zone between coniferous forest and nonforested or woodland vegetation (USFWS 1998a). Specifically, Ute ladies' tresses is a species of wetland habitats. It is often found in habitats that are inundated early in the growing season, such as wet meadows, riparian zones, dry stream channels, river banks, river meadows and floodplains. These sites characteristically retain late season subsurface moisture and exhibit limited overstory cover.

The habitat of the Washington population of Ute ladies' tresses can be described as wetland meadow. It is a periodically flooded alkaline flat adjacent to ponderosa pine and Douglas fir woodland and sagebrush steppe (USFWS 1998a). This population is located at approximately 1,800 feet elevation, lower than other reported populations which are reported from 4,000 to 6,000 feet elevation and range as high as 6,800 feet (USFWS 1998a). Plant species associated with Ute ladies' tresses in Washington include *Eleocharis rostellata, Carex viridula, C. lanuginosa, C. parryana, Panicum occidentale, P. capillare, and Juncus torreyi* (USFWS 1998a*)*. In Idaho, *Agrostis stolonifera, Salix exigua, Equisetum variegatum*, *Eleocharis rostellata*, and *Eleagnus commutata* are commonly associated with *Spiranthes diluvialis* (Moseley 1998).

USFWS (1998) reports that exotic species, including reed canarygrass (*Phalaris arundinacea*), Russian olive (*Eleagnus angustifolia*), Canada thistle (*Cirsium arvense*), whitetop (*Cardaria* spp., and purple loosetrife (*Lythrum salicaria*), can adversely affect habitat for Ute ladies' tresses.

Potential habitat for *Spiranthes diluvialis* is defined in general terms in USFWS (1998). Potential habitats are generally from 1,500 to 7,000 feet elevation in areas where soils is moist to the surface or in the subsurface layer throughout the growing season. The presence of assoicated species is an indicator of potential habitat, as is the presence of other orchid species including *Spiranthes romanzoffiana*, *Habenaria* spp., and *Epipactis gigantea*.

Habitats disqualified from consideration as potential habitat for Ute ladies' tresses (USFWS 1998a) include (in part): areas composed primarily of upland vegetation; sites characterized by aquatic vegetation in standing water; sites with abrupt transition from stream margin to upland areas; riparian areas or stream banks vegetated by dense rhizomatous species such as reed canarygrass or common reed (*Phragmites australis*); agricultural lands; and riparian areas managed such that the vegetation is composed of upland native or weedy species.

4. Potential Effects of the Proposed Project on Listed Species or Designated Critical Habitat

Fish Species

A review of USGS topographic maps and aerial photographs (U.S. Army Corps Of Engineers and Farm Service Agency) was conducted for the project site and laterals to determine the presence and location of naturally occurring and man-made surface water bodies, including streams, ponds, and lakes. Water bodies present in the project vicinity include small, man-made surface water impoundments (irrigation and water treatment ponds), irrigation canals and drains, Lake Wallula- a reservoir impoundment of the McNary Dam project on the Columbia River, and the Walla Walla River.

Initial field surveys were performed on August 22, 2000 and September 13, 2000 to ascertain the origin and characteristics of small impoundments, canals and drains in the project vicinity. It was determined that the surface-water bodies in the immediate locations of the project site and pipeline laterals are appurtenances of agricultural and industrial activities, and did not exist prior to these activities. Field visits also confirmed that these water bodies have no direct surface connectivity to the Columbia and Walla Walla Rivers. A follow-up site visit on January 3, 2001 further confirmed that irrigation ponds A, B, C, and D on the project site do not have direct surface connectivity to the Columbia River/Lake Wallula.

Consultations with personnel of the Natural Resources Conservation Service (NRCS 2001) and the Army Corps of Engineers (USACOE 2001c) support the conclusion that naturally occurring surface-water bodies are nonexistent in the immediate area of the project site and pipeline laterals. These agency representatives provided additional confirmation that there is no direct surface connectivity of man-made impoundments and irrigation canal and drains in the project vicinity with the Columbia and Walla Walla rivers.

The project site contains four small irrigation ponds that were surveyed for fish presence on six separate occasions. No salmonid species were ever found in these ponds and water quality measurements found that summer temperatures in the ponds exceed 20°C, which is well above optimal temperatures for the listed fish species (Wallula Generation 2001).

As there is no connectivity between any of the proposed project locations and the surface waters of either the Columbia River or the Walla Walla River; construction and operation of the proposed power plant and its laterals is not expected to affect listed fish species.

Terrestrial Species

Bald Eagle

The project site supports limited food resources for bald eagles. Ducks were observed in small numbers on the agricultural ponds on the west side of the project site. The primary irrigation pond, located in the northeast corner of the site, is typically dry between late October and late March. Canada geese were frequently observed in the alfalfa fields at the project site and the adjacent property to the north. Bald eagles were not observed feeding on or hunting for waterfowl on the project site.

Construction and operation of the Wallula Power Project will result in removal of the irrigated crop circle and agricultural ponds on the project site. Approximately 100 acres of the 175-acre site will be converted to power plant structures and related facilities. Remaining lands will be maintained as shrub-steppe habitat. The site will no longer support wintering geese or ducks. Given the low number of waterfowl at the project site relative to other nearby congregations of waterfowl along the Columbia River, as noted during the bald eagle observations, the loss of waterfowl habitat at the project site is not expected to affect wintering bald eagles.

Suitable perch and roost trees are also limited in number on the project site. The largest trees on the site are Lombardy poplars, honey mesquites, and Great Plains cottonwoods of about 20-25 years of age. No stands of mature cottonwoods or other tall trees are present. Bald eagles were not observed perching in any trees on the project site during the survey and due to the limited number of trees, the site would provide poor quality night roosting habitat. In addition, there are numerous perch trees available nearby along the Columbia River. Therefore, the clearing of vegetation on the project site is not expected to affect bald eagles.

Congregations of waterfowl and suitable perch trees are also absent from the locations of the proposed natural gas and industrial makeup water pipelines. Canada geese, gulls, and several species of songbirds are frequently observed at the Boise Cascade compost facility southeast of the project site. However, no bald eagles were observed at this site during the survey. No water bodies supporting waterfowl are present along the laterals. Perch and roost trees are limited to the hybrid poplars of the Boise Cascade Wallula Tree Farm. These trees may reach 75 feet in height before harvest, but are removed and regrown on a 7-year rotation. The poplar stands do not provide observation points for congregations of waterfowl. Due to the absence of food sources and suitable perch trees, the proposed construction and operation of the natural gas and makeup water pipelines is not expected to affect bald eagles.

Construction activity at the project site, including the access road, is scheduled to occur over a 24-month period. Prolonged, noisy activities will occur on the project site approximately 1,000 feet (and possibly as close as 500 feet) to the observation station Refuge South. These activities will be ongoing during the period when bald eagles arrive and utilize the Columbia River corridor but will not involve blasting or other excessively noisy activities. Bald eagles wintering along the Columbia River in the project vicinity apparently are habituated to the noise of traffic on U.S. Highway 12, given the high use of perches near the highway at Station 18, Refuge South, Refuge North and Casey Pond.

Studies have found that bald eagles in areas with high levels of human use become tolerant of human activities, especially interactions with vehicles as opposed to humans in open view (Stalmaster and Kaiser 1998, Skagen 1980). The additional noise and traffic caused by project construction over the two-year construction period is not expected to adversely affect wintering bald eagles.

Construction and operation of the power project will result in slight increases in human presence in the area. Studies have found that bald eagles tend to avoid areas within 500-1600 feet of visible humans. However, eagles return to these areas from between 0.5 hours and 4 hours after the human interaction (McGarigal et al. 1991, Skagen 1980). Bald eagles frequently perched in the cottonwood trees at the Refuge South station (26 of 71 sightings; SEA 2001). The stand of cottonwood trees is located about 1500 feet from the southwestern edge of the project site, and about 2000 feet from the location of the proposed power plant and operations facilities. The Refuge North station was used less frequently by bald eagles, with only eight sightings recorded (SEA 2001). This station is located (at its closest point) approximately 600 feet from the western boundary of the project site and about 1000 feet from the power plant. There was no documented hunting or perching within on the project site itself. The increased human presence during construction and operation will be located more than 600 feet away from a documented bald eagle use areas, and about 1500 feet from a documented site of frequently used bald eagle perch trees. Because of the generally high level of human activity and presence in the general vicinity, including highway and train traffic, farm workers, and visitors/hunters at the Refuge and on Lake Wallula, the increase of human presence caused by the construction and operation of the power project is not expected to affect bald eagles.

Construction activities at the natural gas pipeline and makeup water pipeline laterals will occur over an approximately 3-month period. These laterals are located well away from documented bald eagle use areas. Construction at these sites is not expected to affect bald eagles.

Avian collisions with towers and other tall structures have been documented in the literature (Weir 1976, Avery et al. 1980, California Energy Commission 1995, USFWS 1998b). Illuminated latticework towers, particularly those over 200 feet in height and supported by guy wires, are particularly likely to experience collisions (Weir 1976, Evans and Manville 2000). The class of birds affected in the greatest numbers is neotropical migratory birds, which migrate primarily at night (Manville 2000).

The Wallula Power Project facilities include four heat recovery steam boiler exhaust stacks, each 20 feet in diameter and 175 feet tall. These towers will be freestanding, extending above the heat recovery steam boiler structures by approximately 77 feet. Preliminary information from the Federal Aviation Administration indicates that aviation safety lighting will not be required for these structures. If required, the lighting would meet the recommendations in the U.S. Fish and Wildlife Service September 14, 2000 Draft Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers (USFWS 2000a). Other project facilities do not exceed 100 feet in height and will be illuminated as necessary with down-shielded security lights. The project structures are not expected to impede the ability of bald eagles to fly through the project vicinity.

***Ute ladies' tresses* (*Spiranthes diluvialis*)**

No habitat suitable for *Spiranthes diluvialis* occurs on the project site or adjacent properties proposed for placement of the access roads. Wetland habitats are present on the Wallula Power Project site adjacent to irrigation ponds on the west side and northeast corner of the property. The west side wetlands are dominated by Russian olive, reed canarygrass, whitetop, poison hemlock (*Sium suave*), cattail (*Typha latifolia*), and other weedy species. No suitable habitat is present based on the dense growth of weedy non-native species at these wetlands. The irrigation pond in the northeast corner is steep-sided, transitioning over ten to twenty feet from aquatic to upland habitat. A narrow fringe of willow, Russian olive, Great Plains cottonwood (*Populus deltoides* var. *occidentalis*), and honey locust (*Gleditsia* sp.) are located on the berm surrounding the pond. Emergent vegetation within the pond includes cattail and hardstem bulrush.

No wetland habitats, and no potential habitat for Ute ladies' tresses, are present along the proposed project laterals.

Field surveys of project habitats in August 2000 and spring 2001 (Wallula Generation 2001) confirm the absence of suitable habitat for Ute ladies' tresses. The majority of wetland habitats are dominated by dense growth of non-native weeds and native weedy species. Vegetation and wetland field investigations also indicate a relative lack of associated species that could indicate potential habitat. No other orchid species were found on the project site. Two species associated with *Spiranthes diluvialis* in Okanogan County were reported as occasional on the project site: *Panicum capillare* and *Juncus torreyi*. None of the dominant plant species at the project site are species associated with Ute ladies' tresses.

The Wallula Power Project will not affect Ute ladies' tresses or its habitat.

5. Summary

Construction and operation of the proposed Wallula Power Project are not expected to affect listed or candidate fish species since no surface water bodies capable of supporting bull trout or Pacific salmon are present on the project site or the sites of project laterals. Irrigation ponds on the project site do not have surface water connection to the Columbia River.

Wintering bald eagles that utilize the Columbia River and Walla Walla River shorelines in the project vicinity are not expected to be affected by project construction or operation. Bald eagle use areas documented in the winter 2000-2001 surveys are located at distances of 600 feet or greater from the project site. Bald eagle nests or night roosts have not been documented in the project vicinity. Critical habitat for bald eagles has not been designated in the project vicinity.

Construction and operation of the proposed power project is not expected to affect the threatened orchid species *Spiranthes diluvialis*. Habitat suitable for this species is not present at the project site or along the proposed laterals. The nearest documented sighting of this species is over 200 miles distant.

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Appendix A: USFWS Letter Dated August 29, 2001

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Upper Columbia Fish and Wildlife Office
11103 E. Montgomery Drive
Spokane, WA 99206

August 29, 2001

Kathleen W. Smayda
Smayda Environmental Associates, Inc.
139 NE 61st Street
Seattle, Washington 98115

Subject: Updated Species List for the Wallula Power Project, Walla Walla County, Washington (File #870.2300)

Reference Number: 1-9-01-SP-0687: Cross Reference: 1-9-01-SP-85

Dear Ms. Smayda:

Per your August 22, 2001, request, the U.S. Fish and Wildlife Service (Service) is writing to update the November 7, 2000, species list FWS 1-9-01-SP-85 for the subject project. There have been changes to this list. Our records indicate that the following listed species may occur in the vicinity of the project and could potentially be affected by it:

LISTED

Threatened
Bald eagle *(Haliaeetus leucocephalus)*
Bull trout *(Salvelinus confluentus)*
Ute ladies'-tresses *(Spiranthes diluvialis)*

This letter officially updates the previous list, and provides you with a new reference number, 1-9-01-SP-0687. You should refer to this species list number in all subsequent correspondence. This update fulfills the requirements of the Service under section 7(c) of the Endangered Species Act of 1973 (Act), as amended.

Information regarding Federal agency obligations under the Act, biological assessments, and candidate species has been provided to you in previous correspondence from this office. If you have questions, please contact Carrie Cordova in this office at (509) 893-8022. Thank you for your efforts to protect our nation's species and their habitats.

Sincerely,

Suzanne Audet

For Supervisor

c: Rick Donaldson, UCFWS, Spokane
WNHP, Olympia
WDFW, Region 1

Appendix B: Run-Timing and Spatial Distribution Of Listed Anadromous Pacific Salmonids (*Oncorhynchus sp.)* In Lake Wallula

Run Timing

Run timing of anadromous salmonids is a function of genetic phenotype, but varies with stream-flow hydrograph, water temperature, and probably other factors. Over time, average distributions for individual runs or groups of runs may be established from sampling at hydroelectric dams. Sampling data of anadromous salmonid populations that pass across the McNary Hydroelectric Dam, operated by the U.S. Army Corps of Engineers, provided the informational basis for a salmonid run timing analysis. An analysis was performed to estimate the run timing of anadromous salmonid populations passing through Lake Wallula in the vicinity of the project. This analysis is based on data of the Fish Passage Center. A series of figures (**Figures 1** through **7**) illustrate the run timing of these populations using McNary Dam fish counts as a relative measure of run timing in Lake Wallula. The raw data used for the analysis and generation of the figures are not included in the appendix, but are readily available on the Fish Passage Center website (http://www.fpc.org/Index.htm).

As can be seen in **Figure 1**, juvenile sub-yearling chinook salmon outmigrate from late June through early August, with the bulk of the fish passing McNary Dam in July. By the end of the curve, most of these fish are probably from the middle Columbia River stocks, having been delayed in outmigration by their location and the lower flows. Snake River fall chinook juveniles probably make up a lesser percentage of the fish at this time, as water temperatures in the Snake River extirpate them by July (Waples et al. 1991). Increases in both desirable food supply (cladoceran zooplankton) and water temperature in late summer tend to metabolically offset each other to some degree. Yearling chinook, having over-wintered in the system, migrate across McNary Dam earlier, in the April through June period **(Figure 2)**, well before the warmer water of late summer and early autumn. Before the completion of the Columbia River dams, there were significant runs of spring, summer, and fall chinook that passed through the subject area. Most of the adult chinook now pass during the September and October period and are therefore considered fall chinook. These fish are both of wild and hatchery origin and include the large-body-sized chinook bound for spawning in the Hanford Reach, in the free-flowing area above Lake Wallula and below Priest Rapids Dam. **Figure 3** shows the passage of adult spring chinook during the mid-April to early June period, as well as minor percentages of fish passing through the subject area in midsummer.

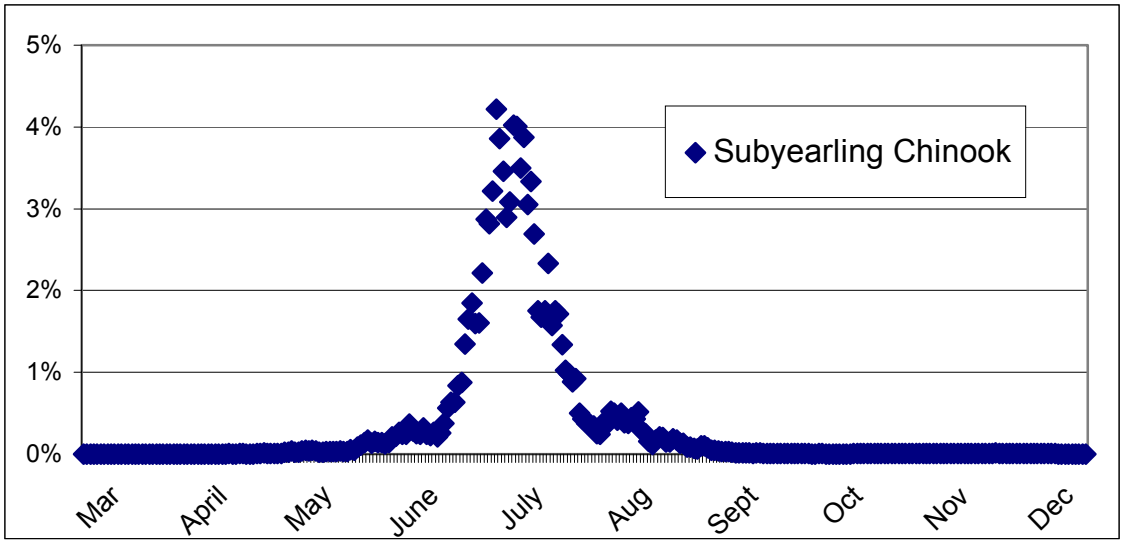

Figure 1. Run Timing Of Juvenile, Subyearling Chinook Salmon At McNary Dam, 1989–1999, In Percent/Day Passage (Fish Passage Center Data).

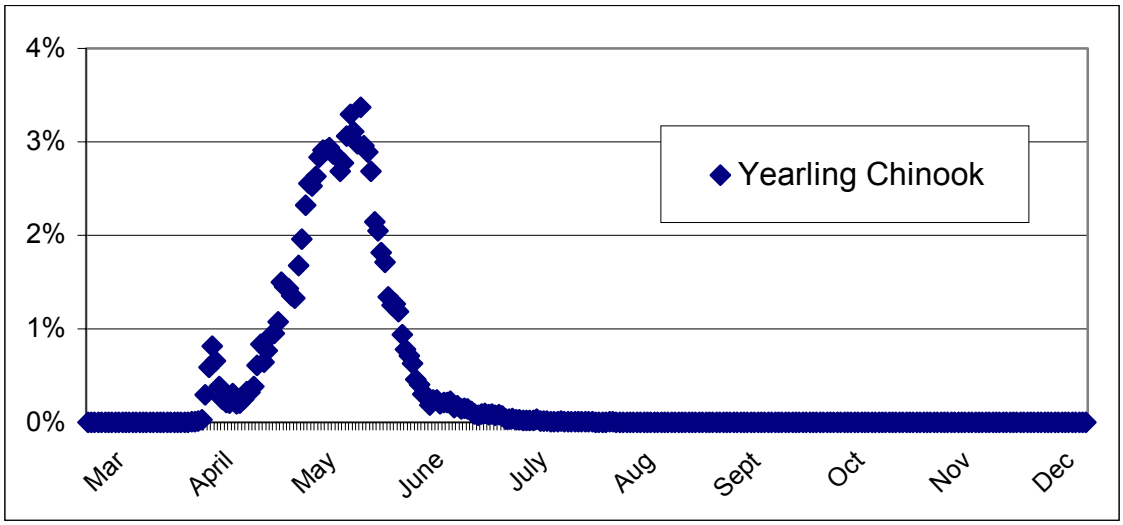

Figure 2. Run Timing Of Juvenile, Yearling Chinook Salmon At McNary Dam, 1989–1999 In Percent/Day Passage (Fish Passage Center Data).

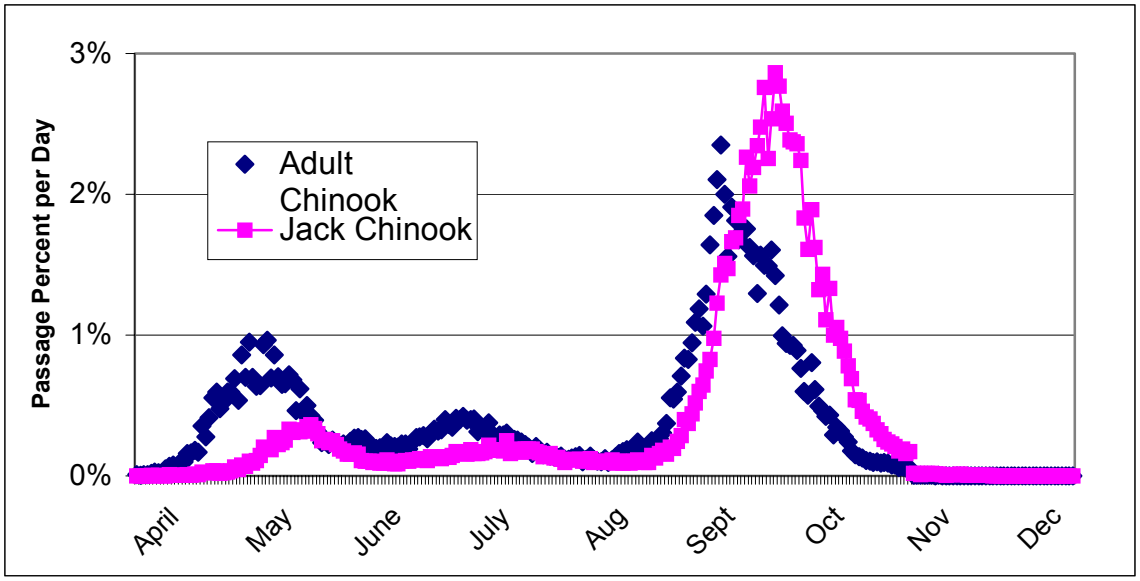

Figure 3. Run Timing Of Adult And Jack Chinook Salmon At McNary Dam, 1989–1999, In Percent/Day Passage (Fish Passage Center Data).

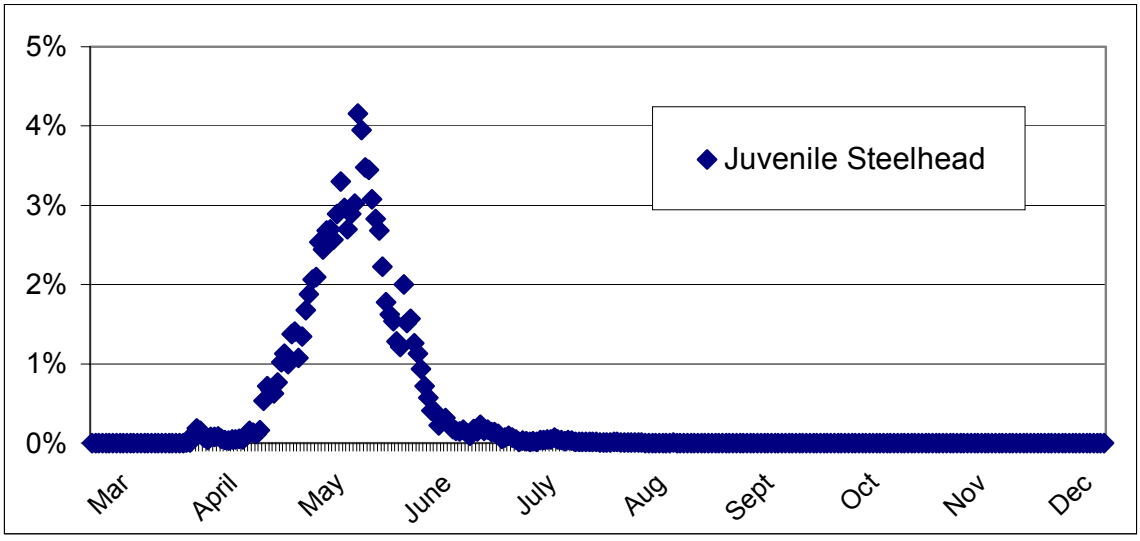

Figure 4. Run Timing Of Juvenile, Subyearling Chinook Salmon At McNary Dam, 1989–1999 In Percent/Day Passage (Fish Passage Center Data).

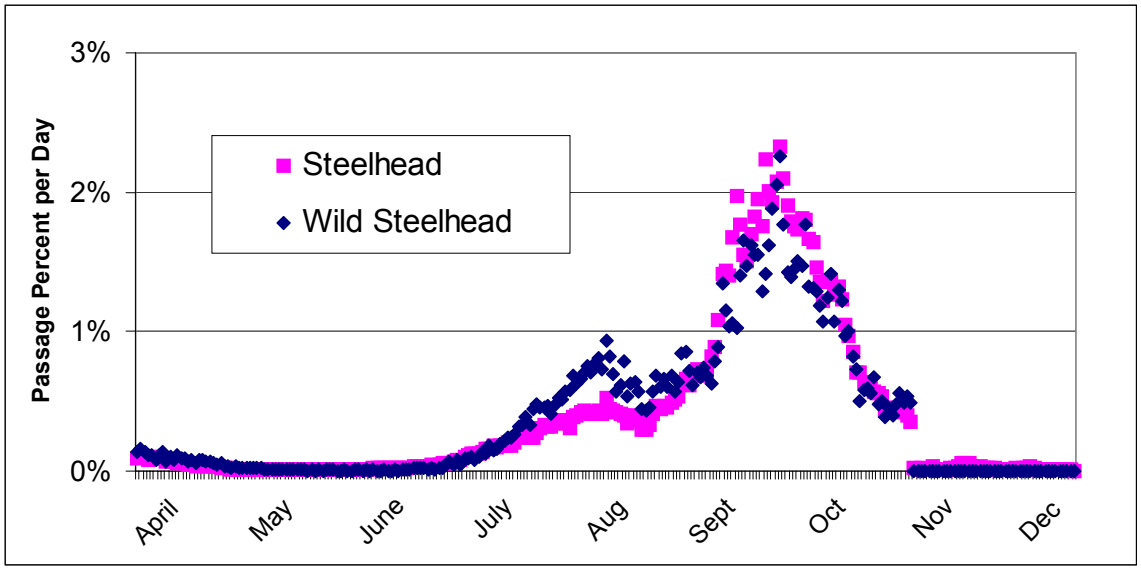

Figure 5. Run Timing Of Adult Steelhead And Wild Steelhead At McNary Dam, 1989-1999, In Percent/Day Passage (Fish Passage Center Data).

Juvenile steelhead pass McNary Dam in spring, with a symmetrical run timing centered around early May **(Figure 4)**. These are the largest of the salmonid smolts in the system, and as flows are generally high, they move quickly through the system (Chapman et al. 1994b). In contrast, adult steelhead run timing at McNary Dam is focused more in the midsummer to fall period **(Figure 5)**. There is a major peak around October 1st and significant percentages passing between July and November. Wild steelhead adults have similar temporal distribution with a minor divergence in August.

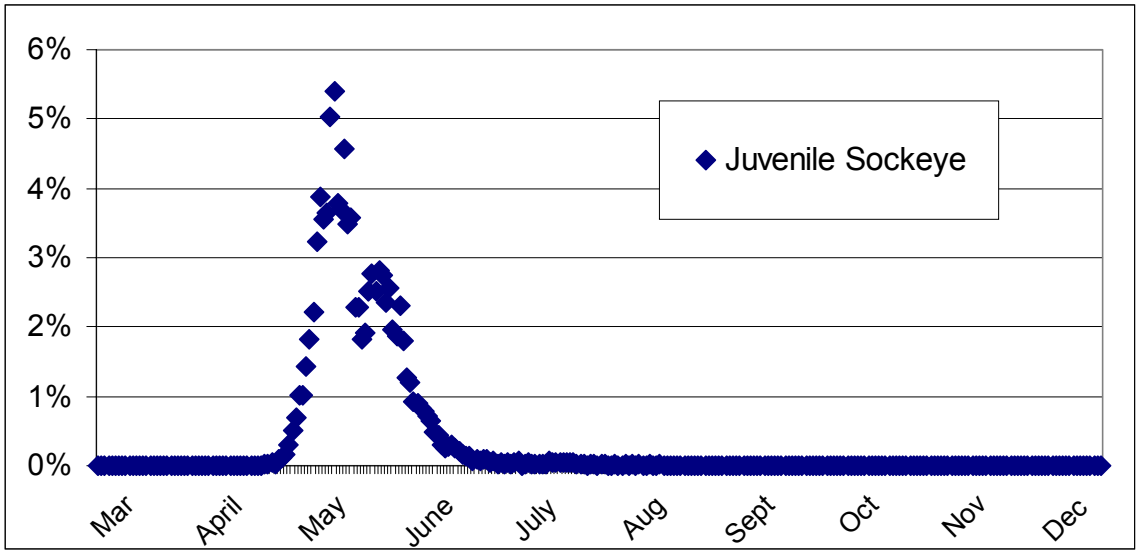

Figure 6. Run Timing Of Juvenile Sockeye Salmon At McNary Dam, 1989–1999, In Percent/Day Passage (Fish Passage Center Data).

Sockeye salmon juveniles tend to move into the McNary area quickly in May, but the distribution is skewed out more to the trailing tail **(Figure 6)**. Although juvenile sockeye and kokanee prefer large-bodied crustacean zooplankton as primary prey, there is often a seasonal decline of their

prey in late spring in natal lakes (Rensel 1993) and similarly they are not abundant in main-stem reservoirs at this time (Haskell et al. in press), Normandeau 2000, Parametrix et al. 2000). Because of lower water temperatures at that time, required food ration is less than later in the year.

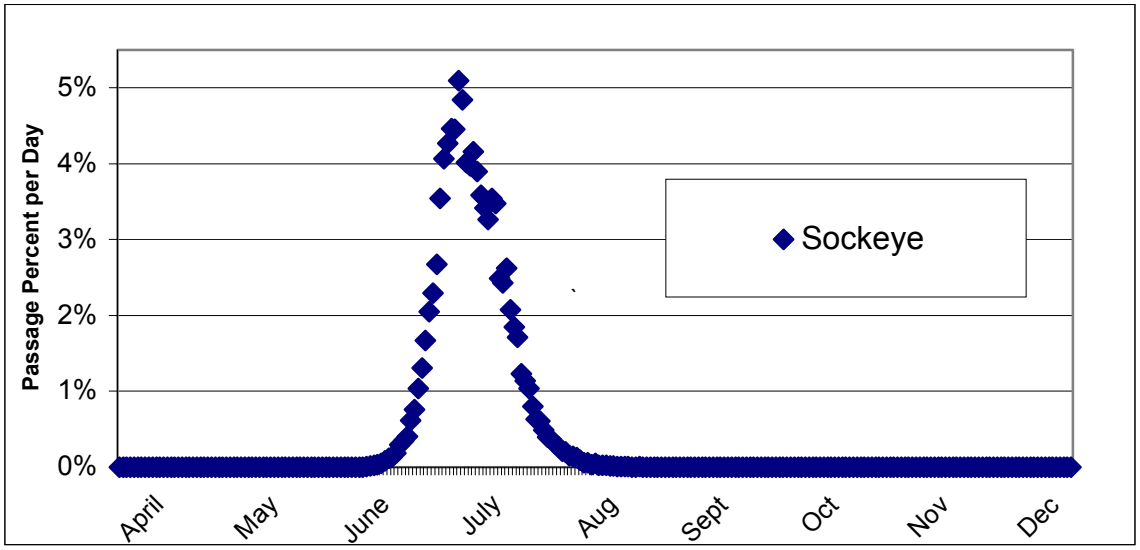

Figure 7. Run Timing Of Adult Sockeye Salmon At McNary Dam, 1989–1999, In Percent/Day Passage (Fish Passage Center Data).

Sockeye salmon adults have a relatively narrow and normal-shaped passage-timing curve, with a peak on July 2nd **(Figure 7)**. These fish are of Snake River, Okanogan River, or Lake Wenatchee stocks, although the former are depleted to an extent that the curve probably reflects mostly the latter.

Spatial Distribution

Some limited studies have been conducted in Lake Wallula and nearby reservoirs that give insight into the spatial distribution of salmon, steelhead and resident fish. This section concentrates on the former two groups, in light of their current ESA status.

Chinook Salmon

In general, the distribution of juvenile fish outmigrating to the Pacific Ocean is divided between the two life-history types of chinook salmon presently populating the mid-Columbia River and tributaries: Spring chinook ("stream type" or yearlings) and summer–fall chinook ("ocean type" or underyearlings). Both Columbia River and Snake River mainstems and some tributaries have populations manifesting these differing life-history types. The type categorization refers to where they spend much of their first rearing year, the stream type in the river or other freshwater areas, and the ocean type in the Pacific Ocean after outmigration downriver. There is large variation from stock to stock and with differing climate and other environmental conditions. Meyers et al. (1998) provides a more extensive description of these life-history types. Discrimination of ocean and stream types in the Columbia River is somewhat subjective. Outmigrants passing Priest Rapids Dam (RM 397.1) prior to and after June 13th are categorized respectively as 'river type' and 'ocean type' (Beak Consultants 1996).

The stream-type chinook are generally larger and tend to use mid-channel habitats when outmigrating (Ledgerwood et al. 1994, and Burley & Poe 1994), although there are exceptions. They outmigrate during a period of cooler water and higher flows, and it can be assumed that these fish probably occupy more of the pelagic zone than their smaller, later-outmigrating relatives, the ocean-types.

In contrast, ocean-type juvenile chinook use shallow littoral areas shortly after emergence in April and May (Becker 1970, and Chapman et al. 1994b). Differences in timing between lower mid-Columbia River and upper mid-Columbia River chinook stocks may affect spatial distribution (Becker 1970). Differentiation between stream- and ocean-types may be related to predator avoidance and suitability of current velocity to body size, but may also relate to increased food availability nearshore for the smaller fish. Haskell et al. (in press) found higher density of crustacean zooplankton nearshore than offshore in Lake Wallula over a 3-year survey period. Water temperatures nearshore in the spring and summer are also warmer in most of the mid-Columbia reservoirs, which is advantageous for growth earlier in the year. In the Snake River, high water temperatures in the summer apparently prevent juvenile fall chinook salmon from rearing in the mainstem after July. These fish may be extirpated into Lake Wallula for more rearing and outmigration to the sea. In contrast, some fall chinook salmon of the upper Columbia River may rear in the river well into August, reaching lengths of 110–130 mm before migrating to the ocean (Allen & Meekin 1973).

There are also unpublished data suggesting that stream-type juvenile chinook are fairly evenly distributed across channel profiles, based on recent unpublished work of the USGS in Lake Wallula and John Day Reservoirs (D. Rondorf, USGS, personal communication, 20 Oct 2000). Nearer to dam structures, however, one study during May 1980 in the forebay of Priest Rapids Dam found most chinook and sockeye salmon near the edges of the reservoir while steelhead trout were located directly in front of the dam (Stober et al. 1980). Certainly other results are known from other rivers outside the basin (e.g., Healy & Jordan 1982), but there are significant differences in the physical habitat of these studies.

Behavior may also vary on a diel basis; many salmonids actively migrate more at night than during the day. There is some evidence from studies of smaller rivers that salmonids may move inshore at night, but this is not the case for studies of the Columbia River. With regard to depth distribution, many if not all stocks of salmon tend to migrate at shallow, near-surface depths in the Columbia River, at depths less than 20.0 ft (Beak Consultants 1996). Studies show that depth distribution of salmonids varies in the water column from the bottom to 20 feet. In some years, almost all of the salmonids occupied depths less than 6.5 ft; yet in other years, they were found at a depth of 6.5–13.0 ft (Weitkamp 1974, Seattle Marine Laboratory 1973).

However, in other locales, some salmonids may establish territorial feeding stations along the bottom as they increase in size above 50 mm; and this is the case for salmon in the Lewis River of Washington State (Campbell & Eddy 1988). To the best of our knowledge, there is no evidence of aforementioned feeding behavior in Lake Wallula. Rondorf, Gray & Farley (1987) found that ocean-type chinook tend to move offshore into areas with current velocity less than 4 feet per second (fps) in June, when reaching about 80-mm in length. For comparison, the highest velocities in tailrace sections of the Columbia are generally on the order of 10 feet per second (fps) or greater.

Adult chinook, moving up the mid-Columbia River, experience some migratory delays due to fallback at dams, which are related to elevated water temperature. Snake River adult fall chinook salmon enter the Columbia River in July and August and reach the mouth of the Snake River

from the mid-August through October (Waples et al. 1991). It is possible, but not documented, that arrivals during August or early September in abnormally warm-water years will hold in the relatively cooler waters of Lake Wallula, as they do in the reservoirs of several hydroelectric projects in the lower Snake River. Utter et al. (1982) presented data documenting substantial differences in water temperature between the upper Columbia and Snake Rivers. Over a 2-year period during the 1960s, the mean monthly summer water temperatures in the mid-Snake River (at Weiser, Idaho) were 6 to 8°C higher than those at Rock Island Dam (RM 453.4) in the upper Columbia River.

In summary, juvenile chinook salmon of ocean- and river- types use different but overlapping areas of Lake Wallula for rearing and migration. Smaller ocean-type chinook tend to use the shoreline areas. Larger stream-type yearlings apparently utilize the entire reservoir including pelagic waters Both types tend to be surface-oriented, and are normally not found in deep, offshore bottom areas. The upstream migration of adult chinook salmon in the Columbia River may be negatively effected during late-spring, summer and early fall seasons when water temperatures are elevated; and Snake River fall chinook may temporarily hold in Lake Wallula until Snake River water temperatures decline later in September.

Sockeye Salmon

Sockeye salmon have the most diverse salmonid life-history patterns (see review by Chapman et al. 1995, Gustafson et al. 1997), but here comments are restricted to those life-history stages of the Snake River run that may pass through Lake Wallula as juveniles or adults. Stober et al. (1980) found juvenile sockeye migrating along the littoral margins of the Columbia River in the Priest Rapids pool. This may or may not be descriptive of other lacustrine sections of the reservoirs. Hartman et al. (1967) suggest that sockeye migrate near the surface of some rivers, but may also like to maintain visual contact with the bottom. These observations led Chapman et al. (1995) to conclude that although somewhat surface-oriented, sockeye tend to migrate at deeper depths than juvenile chinook. The available literature is somewhat scant about this subject, but it suggests that sockeye migrate in the top half of the water column in "clear" rivers (i.e., low-turbidity, high water-transparency areas). Sockeye outmigrants tend to travel in large schools. Surprisingly, Muir and Emmett (1988) found that few outmigrating sockeye near Bonneville Dam consumed zooplankton prey but instead focused mainly on amphipods (*Corophium* spp). These amphipods are tube-dwelling, but are believed to be available to salmon as prey in the water column when displaced by water currents. Water currents vary on short- and long-term cycles in mid-Columbia River reservoirs, with the most variation on a short-term diel basis related to daily peaking of power demand.

Adult sockeye migrating upriver tend to move along in shallow water utilizing eddies and slower water than in the thalweg of the stream channel (Burgner 1991). In the mid-Columbia, adult sockeye move quickly upstream, except into tributaries when water temperatures exceed about 21°C such as often occurs in August in the Brewster Bar area of Lake Pateros. Chapman et al. (1995) presents strong evidence that upstream migration of sockeye adults actually occurs quicker than in pre-impoundment eras, which could be caused by reduced flows in June in the post-impoundment river. Site-specific information was not available on migration of adult sockeye in Lake Wallula, although the endangered Snake River sockeye pass through this area. However, adult sockeye likely utilize both littoral and pelagic spaces in migrating upstream in the middle reaches of Lake Wallula because current velocity is reduced compared with the riverine areas of the lake and the Hanford Reach. Adult sockeye are well known to travel in large schools (population size allowing) throughout their returning coastal and riverine life stage.

Steelhead Trout

Steelhead trout smolts migrate downstream during spring (April and May), when water temperatures are low and stream flows are relatively high. The relationship between flow and outmigration speed and behavior is controversial and complex because the physiological status of steelhead smolts, which is controlled by many factors including water temperature, also interacts to confound a direct flow/speed relationship. Much of the data related to steelhead outmigration involves observed travel times at the dams, not the spatial and depth distribution in the reservoirs that is the focus here. What little data that may be pertinent to this subject is derived from studies of Columbia basin dam forebays and lower pool areas. Stober et al. (1980) found that steelhead in Priest Rapid's forebay were found mostly in the mid-channel, which they related to the large body size and strength of these fish. However, large size is not an advantage when passing through hydroelectric turbines; hence the studies were focused on bypass and entrainment mechanisms for steelhead smolt.

The upstream migration of adult steelhead extends over a long period from early summer through early winter, and hence a wide variety of physical conditions affect their migration. Specific published information was not ascertained in regards to their distribution in Lake Wallula or nearby reservoirs. But, extensive sports fishing for adult steelhead occurs in the Wallula Reservoir, particularly in the area around the mouth of the Snake River, and this activity is an indicator that steelhead may be present in this area during the late summer, fall, and early winter months. Again, the literature tends to focus on passage at dams and the timing as well as gas-saturation effects. Steelhead trout tend to home to their natal streams with high success but experience an inter-dam loss of about 4% (Chapman et al. 1994b).

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SITE PHOTOGRAPHS

[insert two pages of color photos]